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# RECLAMATION SAFETY NEWS



THE LIBRARY OF THE  
MAY 19 1969  
UNIVERSITY OF ILLINOIS

*First Quarter 1969*

UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF RECLAMATION  
OFFICE OF CHIEF ENGINEER



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Front Cover Photo: Curecanti Unit--Morrow Point Dam, Colorado--  
View in the stilling basin showing divers from Colorado Divers Supply  
entering the water to inspect the basin. Bureau of Reclamation Photo  
P622B-427-8773 NA.

EXCERPT FROM REMARKS OF FLOYD E. DOMINY,  
COMMISSIONER OF THE BUREAU OF RECLAMATION

BEFORE THE 50th ANNIVERSARY CONVENTION OF  
THE ASSOCIATED GENERAL CONTRACTORS OF AMERICA

WASHINGTON, D.C.

MARCH 19, 1969

Safety in construction continues to be a major concern to us. We are encouraged by the AGC's efforts to improve safety through such endeavors as your safety training course for construction supervisors. I was particularly impressed with your organization's National Safety Conference held last year here in Washington and which I was privileged to attend. President Armstrong crystallized the overall safety objective when he said at the Safety Conference: "We want safety programs in our industry which will save lives and prevent loss of limb and property to a degree never before obtained."

You are assured that we in Reclamation heartily endorse this objective and will continue to work closely with contractors in improving the safety record in Bureau construction.

# BUREAU SAFETY PERFORMANCE

1969 CUMULATIVE SAFETY RECORD  
January 1 - March 31, 1969

## A. GOVERNMENT FORCES:

<u>Region</u>	<u>Injury index*</u>	<u>Frequency rate</u>	<u>Severity rate</u>	<u>Vehicle accident rate</u>
Region 3	0.0	0.0	0	1.8
Region 2	0.2	1.1	17	2.6
Region 5	0.3	2.6	13	1.0
Region 6	0.6	2.4	24	3.9
Region 4	0.7	4.6	16	1.6
Region 1	3.3	4.1	80	3.8
Region 7	<u>1,704.1</u>	<u>6.5</u>	<u>26,217</u>	<u>3.6</u>
Totals to date	58.5	2.3	2,544	2.5
<hr/>				
Totals 1968	0.4	1.1	33	2.6
<hr/>				

\*Injury index is equal to frequency rate times severity rate divided by 100.

## B. CONTRACTOR FORCES:

<u>Region</u>	<u>Injury index</u>	<u>Frequency rate</u>	<u>Severity rate</u>	<u>Fatal injuries</u>
Region 2	0.0	0.0	0	0
Region 6	0.0	0.0	0	0
Region 5	2.0	3.5	56	0
Region 4	2.6	11.3	23	0
Region 7	36.8	12.4	297	0
Region 1	110.8	14.6	759	0
Region 3	<u>480.4</u>	<u>28.8</u>	<u>1,668</u>	<u>0</u>
Totals to date	45.5	10.1	450	0
<hr/>				
Totals 1968	621.0	12.2	5,090	6
<hr/>				

## C. RECLAMATION CIVILIAN CONSERVATION CENTERS:

Frequency rate	3.7
Severity rate	13
Vehicle accident rate	30.4

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## LOST TIME ACCIDENT ANALYSIS

Government Forces - 1969  
First Quarter

Cumulative to Date:  
March 31, 1969

### A. ACCIDENT CLASSIFICATION:

<u>Description</u>	<u>No.</u>	<u>Days lost</u>
Vehicles	1	16
Flash burns	1	2
Handling materials and equipment	2	14
Falls of persons	5	184
Aircraft (helicopter)	<u>2</u>	<u>12,000</u>
Total	11	12,216

### B. OPERATIONAL SUMMARY:

<u>Operation</u>	<u>Man-hours</u>	<u>No. of accidents</u>	<u>Days lost</u>	<u>Frequency rate</u>	<u>Severity rate</u>
Administration, Clerical and Design	2,040,095	1	6,000	0.5	2,941
Construction	734,966	4	21	5.4	29
Investigation	519,653	2	26	3.8	50
Power O&M	969,351	3	6,122	3.1	6,316
Irrigation O&M	<u>537,668</u>	<u>1</u>	<u>47</u>	<u>1.9</u>	<u>87</u>
Totals	4,801,733	11	12,216	2.3	2,544

\* \* \* \* \*

## THE OBJECTIVE OF HARD HATS

The average safety hard hat weighs about 14 ounces, and the average man's head weighs 14 pounds. So there's an ounce of safety for every pound of head--provided the head protection is properly worn and maintained.

The skull, under normal circumstances, protects the brain. But when a possibility of injury from falling or flying objects exists, additional protection is required. This is the objective of the use of hard hats.

The force of a falling object can be calculated approximately by multiplying the weight of the object by the distance of its fall. A 3-1/2 ounce washer, for example, falling 32 feet, will generate a force of 7 foot pounds of impact. Should this washer strike an unprotected head, the force of the blow would be equivalent to 560 pounds; when a hard hat is worn, the force transmitted to the neck and spine is reduced to 127 pounds.



Tests in a temperature of 110° show that the inside temperature of a cloth cap and a felt hat was 2° cooler than the prevailing outside temperature. The same test revealed the inside temperature of a hard hat varried from 5° to 12° cooler.

\* \* \* \* \*

## ACCIDENTS OF BUREAU EMPLOYEES

### CLASSIFICATION BY AGE GROUP

Calendar Year 1968

<u>Age</u>	<u>No. of employees</u>	<u>Disabling injuries</u>		<u>Nondisabling injuries</u>		<u>Vehicle accidents</u>	
		<u>No.</u>	<u>Percent</u>	<u>No.</u>	<u>Percent</u>	<u>No.</u>	<u>Percent</u>
0-19	123	1	.81	12	9.76	1	.81
20-29	1,313	1	.08	100	7.62	10	.76
30-39	2,192	3	.14	125	5.70	30	1.37
40-49	3,005	11	.37	162	5.39	20	.67
50-59	2,932	6	.20	95	3.24	23	.78
60 & Over	<u>995</u>	<u>1</u>	<u>.10</u>	<u>26</u>	<u>2.61</u>	<u>13</u>	<u>1.31</u>
Total	10,560	23	.22	520	4.92	97	.92
	<u><u>          </u></u>	<u><u>      </u></u>	<u><u>      </u></u>	<u><u>      </u></u>	<u><u>      </u></u>	<u><u>      </u></u>	<u><u>      </u></u>

\* \* \* \* \*



# SAFETY AWARDS

## NATIONAL SAFETY COUNCIL AWARDS FOR 1968

The Bureau of Reclamation has won the National Safety Council's highest award--the Award of Honor--for the fifth time. Previous awards were received from the National Safety Council for calendar years 1963, 1964, 1965 and 1967.

For outstanding safety performance during 1968, the following Regions of the Bureau have received the National Safety Council awards indicated below:

Region 1--Boise, Idaho..... Award of Honor  
Region 2--Sacramento, California.. Award of Honor  
Region 3--Boulder City, Nevada.... Award of Honor  
Region 4--Salt Lake City, Utah..... Award of Merit  
Region 5--Amarillo, Texas..... Award of Honor  
Region 6--Billings, Montana..... Award of Honor  
Region 7--Denver, Colorado..... Award of Honor

### Region 3, Boulder City, Nevada--Region 3 Personnel Roll Up Over A Million Miles of Safe Driving:

Regional Director A. B. West (right) is presented the Department of the Interior's Certificate of Safety Achievement by Regional Safety Engineer Frank J. Kouba of his staff. Employees in the Regional Office attained a total of 1,009,746 miles without a reportable motor vehicle accident between January 1, 1964, and November 30, 1968. Photo PX-D-63944



Folsom Field Division, Folsom, California--Blote Safety Award:



Shown above (left) is Mr. Martin H. Blote presenting the annual Blote Safety Award to Mr. E. M. Axtel, Chief, Plant Maintenance Branch, Folsom Field Division of the Bureau of Reclamation. The highly coveted award is presented each year to the office with the best safety performance record. Bureau operation and maintenance offices at Shasta Dam, Tracy, Fresno, Folsom, and Willows compete for the honor. Following an afternoon tour of the Oroville Dam and Powerplant attended by over 100 Bureau employees, the evening dinner ceremony was held at Prospector's Village in Oroville hosted by the Bureau's Willows Office and the State Department of Water Resources. Speakers included Regional Director Robert J. Pafford, Assistant Regional Director E. F. Sullivan, Regional Safety Officer R. W. Cary, Central Valley Chief of Operations J. R. Hammond, and Division Engineer Robert Jansen, Chief of the State's Division of Operations and Maintenance. Photo PX-D-63950

Parker-Davis Project, Phoenix, Arizona--Department of the Interior  
Certificate of Safety Achievement: Assistant Commissioner N. B.  
Bennett, Jr., is pictured below (left) presenting the Certificate of Safety Achievement to Project Manager Nathan L. Axton. During the period October 25, 1967, through March 31, 1969, the employees of the Parker-Davis Project worked 972,994 man-hours without a disabling injury. Photo PX-D-63947



Shown above are employees of the Headquarters Division of the Parker-Davis Project, who won the Regional Director's Award of Merit for progress toward a goal of error-free performance in power operations. The award trophy, held by Project Manager N. L. Axton, was presented by Regional Director, A. B. West (front, right). Photo PX-D-63946



Minidoka Project, Burley, Idaho--Two Safety Awards Presented at Palisades Dam and Powerplant:

Charles R. "Buck" Robinson, Chief, Palisades Power Field Branch, is shown accepting the Department of the Interior Certificate of Safety Achievement Award from Project Superintendent Glenn H. Simmons (left). The outstanding group of employees who operate and maintain Palisades Dam and Powerplant worked 502,141 man-hours without a disabling injury during the period September 1, 1959, to August 31, 1968. This injury-free record has continued through March 31, 1969. Photo PX-D-63942



Mr. O. R. "Pete" Huskey was named the winner of the Minidoka Project Safety Contest for 1968. Pete is a powerplant operator at Palisades Powerplant. For his efforts in submitting the most accident prevention suggestions during the year, Superintendent Glenn Simmons (right) presented him with a "Green Cross for Safety" pen and pencil set. Photo PX-D-63941

## CONSTRUCTION SAFETY AWARDS



Shown above is William C. Hart (left), Engineer in Charge of the Sacramento Valley CVP Construction Office in Willows, congratulating D. E. "Rusty" Sumpter, Construction Superintendent for Purtzer and Dutton Contractors of Reno, Nevada, as he presents the Bureau of Reclamation "Construction Safety Award" for an outstanding safety record during construction of the settlement basin and intake control structures to the Tehama-Colusa Canal adjacent to the Red Bluff Diversion Dam. Photo PX-D-63949

The contractor's 43 employees completed the \$1,446,500 contract in 75,755 man hours without a lost-time accident.



Mr. Melvin R. Berry, center, Safety Engineer for Power City Construction and Equipment Company accepts the Construction Safety Award from William C. Bouett, Acting Project Construction Engineer for the Red Bluff CVP Construction Office. Mr. Richard Hellbusch, General Foreman for Power City, is at right. Photo PX-D-63948

Power City, under Specifications No. DC-6300A, from April 1966 to July 1968, constructed a 94-mile section of the 500-kv. Pacific Northwest-Pacific Southwest Intertie from BPA Malin substation in Oregon to P. G & E. Round Mountain substation east of Redding, California, with an excellent safety record.

\* \* \* \* \*

# FROM THE FIELD

Columbia Basin Project, Ephrata, Washington--Special Project Safety Committee and Staff Meeting: During a special meeting held recently in Ephrata, the following officials posed for the camera--left to right--Dennis L. Fankhouser, Project Safety Officer; L. V. Downs, Assistant Project Manager; W. E. Rawlings, Project Manager; Guest Speaker, Norman Moore, Assistant Regional Director, and Lauren K. Simon, Regional Safety Officer. Photo PX-D-63943



Region 3, Boulder City, Nevada--Regional Safety Conference: Pictured below are safety personnel from Region 3 at the Regional Safety Conference held on January 21 and 22, 1969. Left to right: Joseph Rausch, Mead Construction Office; Theodore K. Moe; Southern Nevada Water Project; John M. Roberts, Southern California Development Office; William E. Barcus, Jr., Yuma Projects Office; Mildred Rhoades, Regional Safety Office; Frank J. Kouba, Regional Safety Engineer; James H. Butler, Lower Colorado River Project; Curtis B. McGee, Phoenix Development Office; Hubert S. Jerrell, Parker-Davis Project, and Jimmie M. Boyles, Boulder Canyon Project. Photo PX-D-63945





Region 4, Salt Lake City, Utah--Forest Service Avalanche School:  
Six Region 4 employees attended an avalanche school conducted by the Forest Service at Silverton, Colorado. All employees attending the school work in mountainous terrain during winter months, exposing themselves to avalanche conditions.

Curecanti Unit, Montrose, Colorado--Annual Region 4 Safety Conference: The annual Region 4 Safety Conference was held at the Curecanti Unit Office in Montrose, Colorado, on March 24, 1969. Officials attending the conference are shown below. Left to right, standing: M. C. Wren, Lyman Project; Leo Riordan, Curecanti; F. A. Lansberry, Glen Canyon Unit; Eugene Boyt, Curecanti; Eugene Anderson, Paonia Road Rehabilitation; J. D. Seery, Curecanti; Frank Carlson, Central Utah; Ray Hardy, Central Utah; R. E. Oliver, Rock Springs; R. L. Cummings, Curecanti, and Mac Newson, Bostwick Park. Left to right, sitting: K. L. Powers, Regional Engineer; H. S. Latham, Chief Safety Engineer; Mary Jane Due, Regional Solicitor's Office; E. L. Armstrong, Assistant Regional Director; A. S. D'Alessandro, Central Utah; Leo DeGuire, CRSP Power Operations, and R. J. Searle, Regional Safety Officer. Bureau of Reclamation Photo P622A-427-1123 NA.





Fryingpan-Arkansas Project, Pueblo, Colorado--Safety Conference: A Safety Conference for the implementation of an improved safety program on the Fryingpan-Arkansas Project was held at the Ramada Inn in Pueblo, March 3-6, 1969. The sessions covering the technical phases of accident prevention were effectively complimented by speeches on communication and motivation given by outside speakers.

Missouri-Oahe Projects Office, Huron, South Dakota--Annual Coordination Meeting, Construction/PSOO/Power: The annual stage construction and transmission line construction meeting was held in Huron on March 11, 1969. Power O&M and Dispatch people throughout the Region and construction people from North and South Dakota participated in the meeting, as did representatives from the Regional Office in Billings, Montana. The annual Power O&M - Dispatch meeting and a construction meeting were also held in Huron on the following day. (See photo on page 14.)

Navajo Indian Irrigation Project, New Mexico--Mobile Gas Cylinder Carrier: Universal Constructors, Inc., prime contractor for constructing the siphon and concrete-lined main canal (Specifications No. DC-6460) has made a mobile gang carrier for carbon dioxide gas cylinders (see photograph below). The gas is piped through a high pressure flexible hose from these cylinders to the high intensity arc welding operation. The contractor's employees had experienced numerous minor injuries caused by slipping and falling while wrestling the cylinders over obstructions inside a steel-lined siphon. Injuries were reduced and work operations improved by this innovation. Photo P809-529-2239 NA.



Attendants at Joint Construction Meeting, Huron, South Dakota  
March 12, 1969



Front Row: N. C. Staley, H. J. Barber, W. H. Critser, R. Faus,  
M. H. Oleson, Jr., and A. H. Whitmore  
Middle Row: G. A. Jones, R. Rangel, R. V. Bradfield, R. J. Couvier,  
O. M. Halstengard, C. A. Erickson, R. D. Anderson,  
L. M. Hayes, Jr., and R. T. McClure  
Back Row: W. J. Badsteen, J. J. Helgerson, A. P. Peschong, W. R.  
Groseclose, O. L. Larson, A. Olien, E. H. Jefferies,  
D. A. Magstadt, and A. T. Johnson. Photo PX-D-64019

\* \* \* \* \*

## SAVING MAN AND HIS ENVIRONMENT

Reprinted from Editorial in February 1969  
Edition of CONTRACTORS & ENGINEERS

The construction industry got something of a shock at the recent annual meeting of the American Association for the Advancement of Science. During a session on environmental science, a panel of experts discussed the serious problem of pollution. Unfortunately, man continues to pollute the air he breathes, the water he drinks, and the land which sustains him. And among the many sources of pollution, the scientists cited automotive smog, insecticides, detergents, herbicides, radioactive fallout, the pumping of industrial wastes into deep wells, and the use of asbestos in building materials.

Recent studies detected an unusually high incidence of lung cancer and other diseases among construction and insulation workers. This knowledge must be acted upon. Workers exposed to asbestos particles in the atmosphere of construction projects must be provided with adequate respirators and compelled to wear them when necessary.

As technology advances, safety must keep pace with such progress. Visitors to CONEXPO '69 (Construction Equipment Exposition and Road Show), in Chicago this month (February 16-22), will look at a display of construction machinery valued at approximately \$100 million. Since the last show in 1963, the manufacturers of this equipment have plowed back into their products about \$1 billion for research and development.

What the visitor will not readily see in the trimly painted rigs are the built-in safety features put there by the wise manufacturer, who knows that the operator will not run a machine that is unsafe. Furthermore, his contractor employer is as much interested in his safety record as he is in his production record. A poor safety showing will ruin him with his insurance company, just as faulty equipment will bring out the red in his monthly balance sheet.

CONEXPO is sponsored by the Construction Industry Manufacturers Association, with 13 trade associations cooperating. Through its 176 member companies, CIMA has embarked on a program for developing performance standards for the basic types of construction machinery. Such standards will preferably be prepared by nationally or internationally recognized technical societies on a completely unbiased basis. As a start, CIMA is concentrating on the following five different manufacturing segment groups: crawler tractors, front-end loaders, motor graders, motor scrapers, and processing plants--asphalt and crusher.



CIMA limits its activity to soliciting the creation of performance standards only, as opposed to specifications standards that attempt to define how a product is to be manufactured. Performance standards presently cover such items as rollover protective structures; seat belts; emergency braking and steering; falling-object protection; and with the asphalt/crusher plants--air pollution. Eventually CIMA expects to include the whole broad range of construction machinery produced by its members. It would embrace not only equipment standards, but also air-pollution control measures and noise-abatement procedures pertaining to the construction industry.

Last year CIMA worked closely with the California Division of Industrial Safety in issuing new and revised codes affecting construction machinery. It has offered to assist all 50 states, as well as the federal government, with any proposed code revisions. That would include any departments or bureaus that are involved in formulating or considering regulatory orders pertaining to the industry.

As another example of CIMA's approach to the broad area of safety and performance standards, it is currently preparing a crawler-tractor safety manual. This will serve as a trial approach to operators, labor organizations, contractors, and management at all levels in the construction industry. The manual should be a most useful tool in safety training, and in the ultimate objective of preventing accidents.

The increased awareness of safety performance is not limited to this country. Manufacturers selling abroad should be interested in recent legislation in New Zealand. After September 1, 1970, it will be compulsory to provide wheel tractors with a "safety frame" for the operator before any attempt is made to sell such rigs in that country.

CIMA has taken a thoughtful and forward step with its role of sponsoring performance standards. It should be supported by all segments of the construction industry in its efforts to build a safer environment for man, the builder.

\* \* \* \* \*

## CRANE COLLAPSES, ELEVEN DEAD

Eleven workmen were killed recently when the latticed jib of a 300-foot-high tower crane gave way near Kingston, Jamaica. The crane was placing wedge-shaped, trussed roof sections atop an aluminum ore storage tank at the time of the accident. Four of five sections in place went down with the jib. Authorities are investigating the cause of the accident.

\* \* \* \* \*

## ROLL-OVER TEST FOR HOUGH DOZER'S CANOPY

Reprinted from February 1969 Edition  
of WESTERN CONSTRUCTION

Engineers from International Harvester Company recently turned a 36,500-lb rubber-tired dozer into a guinea pig to double-check the strength of its safety canopy. On paper, the test canopy was strong enough to withstand a 360-degree roll-over. Now IH engineers sought definitive proof.

Their guinea pig--worth about a dollar a pound on the hoof--was a Hough D-90 Paydozer with the blade removed but with steel slabs added to the undercarriage to approximate the weight and balance characteristics of a standard dozer.

The machine and the canopy already had survived one 90-degree upset, in a test made from a stationary position. But dozers don't upset when they're standing still, so that test failed to satisfy the engineers completely.

To gain additional data, a test crew at International Harvester's proving grounds instrumented the canopy with strain gauges and deflection recording devices and rigged the dozer so that it could be operated remotely.

Then a ramp was constructed along the top edge of a deep gravel pit. The idea was to run the dozer along the ramp until it reached a predetermined spot where both right wheels would begin to slip off the ramp and, in theory, the dozer would tip over and roll to the floor of the gravel pit, 60 feet below.

But forcing the low-slung, articulated dozer to roll over turned out to be a problem. On its first four runs, conducted over a period of two and a half days, it wouldn't tip. Instead, the machine slid sideways and came to rest on all four wheels on a ledge about 9 feet below the ramp. On the fifth run, the tractor's speed was increased to 7 mph. Finally, as the dozer's balance point approached 50 degrees, it started to tip. The dozer slammed into the ledge below the ramp, rolled over, and plunged to the bottom of the gravel pit.

It came to rest in the upside-down position, with the canopy completely buried in loose gravel--but intact.

As the dozer tumbled to the bottom of the gravel pit, shock forces and deflection tendencies were monitored on an array of instruments and recording devices.

This was the first time a dozer of this size and type had been subjected to a roll-over under carefully controlled laboratory conditions. Information now is being evaluated and later a full report will be made available to other equipment manufacturers.

\* \* \* \* \*

## CLICHES TO THINK ABOUT

"ALL ACCIDENTS ARE PREVENTABLE"--Abstractly, this may be a true statement; in reality, it is false--for the real world and real people doing real jobs bring so many variables into the equation of accident prevention that it is not actually possible to prevent all injuries. This does not minimize the reality and experience that many or most accidents can be prevented, if we are willing to apply knowledge, techniques, and education at all levels. However, until the concept that we can be perfect in safety (which we cannot be in any other phase of activity involving people) is replaced with a concept of a responsible understanding that all accidents cannot, in fact, be prevented, we are laboring under an illusion.

"MOST ACCIDENTS ARE DUE TO CARELESSNESS"--This widely appreciated phrase is true or false depending on how one defines "carelessness." If we mean that the whole accident prevention system, from top management through the environment to the worker has been less than complete, it is probably true. Unfortunately, as usually applied, it is intended to apply judgment on a specific act or person performing an act. People will do (a) what they have to; (b) what they are told to; or (c) what they feel like doing. If this complex system of variables includes ignorance, indifference, rebellion, emotional instability, or hostility as examples, it is true that carelessness is an important factor--carelessness in the sense of inadequate control--either of the man or what he was expected to do.

\* \* \* \* \*

Remarks by Howard S. Latham, Chief Safety Engineer, Bureau of Reclamation, before the Construction Engineer's Conference - February 26, 1969

### ENFORCE THOSE SAFETY STANDARDS!

I want to congratulate you for your part in obtaining the finest safety record in Reclamation's history. During 1968, over 10,000 Bureau employees worked over 20,600,000 man-hours, experiencing only 23 minor disabling injuries. We also obtained record lows in the number of vehicle accidents, fire losses, and accidents involving property damage.

Unfortunately, there is another side to the coin. Bluntly speaking, our construction accident record is not good. While the contractor's accident frequency rate improved slightly during 1968, we must be sobered by the fact that six contractor employees lost their lives on Bureau contract work. This approached the rate of one life for each million man-hours worked--the rate prevalent when Reclamation was being severely criticized for a poor contractor safety record.

In addition to humanitarian motivations, there are other compelling reasons why this trend cannot be permitted to continue. Poor contractor accident experience is reflected in higher bids due to the inroads made on operating costs. Increased insurance premiums, damage to equipment and material, and loss of production and efficiency resulting from accidents are all reflected in the cost of construction.

There is also a persistent and growing criticism of both the construction industry and Federal agencies for the poor accident record. Last year two separate attempts were made in Congress to legislate safety. Either attempt, if successful, would have placed the promulgation and enforcement of construction safety standards in the hands of the Department of Labor. Safety standards would be drafted by persons unfamiliar with the work and enforced through fear of fine or imprisonment. This would appear to be a poor substitute for incorporating safety standards in all Federal construction specifications, and enforcing them in the same manner as other contract requirements.

Also, the Bureau and other Federal agencies responsible for public work, are faced with an increasing number of tort claims being brought against the Government on the basis of failure to provide a safe work environment or for alleged negligence in the enforcement of safety standards. Harry Philo left little doubt that he sincerely believes "fear of liability" is the most effective inducement to contractor safety. What he left unsaid was the motivation for alert plaintiff's attorneys to capitalize on the Federal Tort Claims Act.



Currently, there are six claims against Reclamation in the aggregate amount of \$3,000,000. All of these claims are based on alleged neglect or omissions in enforcing Bureau construction safety standards.

A point to keep in mind is that the absence of safety standards in the contract is no defense. In the absence of contractual standards the plaintiff has recourse to the many state and national safety codes as evidence of reasonable care required to protect his person. Don Young has given you ample proof that these claims constitute a real threat--and must be considered as such in the administration of Bureau contracts.

Failure to insure compliance with Bureau safety standards will surely result in undesirable legislation, expensive and embarrassing litigation, and increased construction costs. Why is uncompromising compliance with safety standards so crucial to a successful safety effort? Over 80 percent of contractor accidents involve a violation of one or more of our safety requirements--either on the part of the contractor or his employees. In a 3-year period, violations of Bureau safety standards were evident in 22 of 24 fatal accidents.

Your insistence on uncompromising compliance with the safety standards is the only way the current situation can be improved. Unfortunately, there is ample evidence in the Bureau that the safety standards are being ignored or neglected. On too many Bureau jobs, you can still find violations of common safety standards--and ironically, while the most common safety requirements are often the most ignored, they cause many of the most tragic accidents. For example:

In spite of the fact that our scaffolding requirements are precise and specific, scaffolding is too often nonexistent--or constructed without adequate handrails, toeboards, or proper decking.

Contractor employees are permitted to work without required protection, such as hard hats, safety belts, safety goggles, respirators, etc.

Hoisting equipment is permitted to operate prior to being performance tested, or without the operator having undergone a physical examination as required.

Linemen are permitted to work on electrical equipment that has not been properly "bussed-out" and grounded as spelled out in the specifications.

Housekeeping is often so bad that it literally impedes the progress of the work.



While not as prevalent, we still observe these and similar hazardous conditions which reflect on our ability to properly administer a construction contract. Since a Bureau inspector is usually present, such violations are even more difficult to understand--and to excuse.

Nowhere in the contract or in Bureau policy is it either stated or implied that safety requirements can be ignored. Nowhere is it stated that a safety requirement can be overlooked or waived on the basis of expediency or economy. Nowhere are you authorized to excuse or waive compliance because the job is just getting started or because someone determines there is an emergency. -- In fact, the opposite is true. --Safety requirements can only be waived "where literal application of a requirement to a specific job has impractical aspects," and then only if the adaptation affords the protection intended by the original requirement.

Waivers should only be approved in writing and if questionable discussed with this office prior to approval. You should also report instances where you are unable to secure the contractor's compliance. As construction engineers, you have the same responsibility for enforcing safety standards as you do other contract provisions. This is the only way we can improve the record and stay out of the courtroom.

The majority of contractors are safety conscious and are desirous of having a good safety record. They will usually comply with the standards on their own initiative; or readily comply when violations are brought to their attention. On the other hand, there are contractors who neither care nor desire to manage a job safely. In these instances, unless you forcefully and effectively require compliance--and have the fortitude to invoke the penalties for failure to comply--the employees and the Government are sure to be losers.

Considering the consequences facing Reclamation and the Government, if the unsatisfactory safety record is permitted to continue, I think we have to change our basic concept of safety administration. In the past, we proclaimed that we considered safety equal to the quality of the product. I think it is time we made up our minds that safety is FIRST in Reclamation. That it comes ahead of quality. That it takes precedence over both production and cost. That, in fact, it comes ahead of every service that we perform.

\* \* \* \* \*

Boss: "I wish you wouldn't whistle at your work."  
Clerk: "I wasn't working."

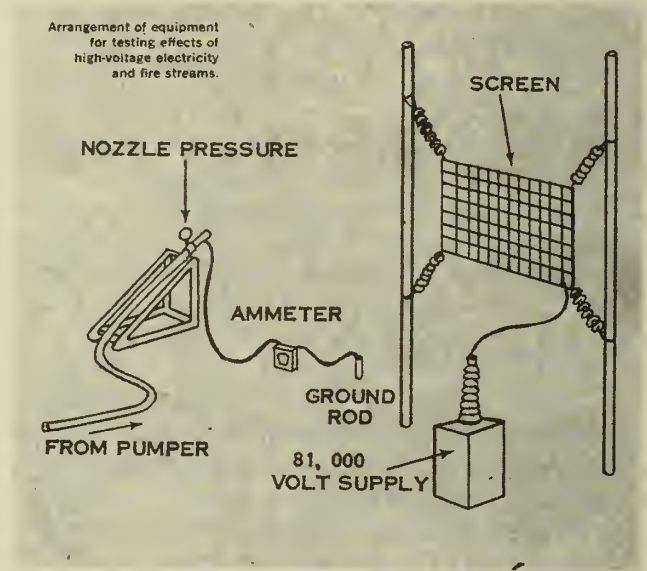
Tests determine  
minimum distances  
acceptable for

## NOZZLE SAFETY AT HIGH-VOLTAGE FIRES

By R. L. Nailen  
Staff Correspondent

-- Reprinted from FIRE ENGINEERING  
(January 1968)

Water can be effective in controlling electrical fires in substation equipment. Hydrant or well water, however, is an electrical conductor, which means potential danger to fire fighters. At a Phoenix meeting of the Edison Electric Institute some months ago, J. P. Hunt, Toledo (Ohio) Edison Company substations maintenance and construction engineer, described tests his company made to determine how fire streams might safely be employed around high voltage electrical equipment.



Controlling substation fires quickly is essential, pointed out Hunt, because often "the greatest damage isn't directly from fire, but from the effect of heat on the unprotected steel of substation structures." Thus, water is even more important as a cooling medium for the rest of the structure than it is as an extinguishing agent.

Public utilities have long known that water fog can be used to clean insulators on high voltage power lines without endangering men at the nozzle or shortcircuiting the lines. Similarly, fog deluge spray systems are in wide use as fire protection for large transformers at generating stations. Occasionally, such systems have been accidentally triggered while the circuits were live without causing a short circuit. What happens is that the individual water droplets in the stream are separated by air spaces sufficient to prevent significant current flow back to the nozzle.

Therefore, figured Hunt, "If hose streams were sufficiently atomized to keep that current down to a safe level, fire fighters could safely enter an energized substation to knock the fire down without cutting the power."

The importance of keeping power going has been proved by the near-disastrous effects of power blackouts around the country.

Toledo Edison's tests produced easy-to-use rules of thumb enabling fire fighters to operate a safe distance from substation equipment. The approach distance depends only on the type and size of nozzle used. Hunt emphasized that these tests, and the resulting rules, are valid only for the particular types of nozzles tested.

The test facility (see drawing) included a 4- x 8-foot wire screen, supported between 35-foot poles. An attached transformer energized the screen at 81,000 volts to ground--the approximate value encountered on a transmission system operating at 138,000 volts between lines. The leakage current flowing back to ground via the stream and nozzle was measured to check the safety of a man at the nozzle. Many past studies have established the maximum value such current can have without presenting a hazard. In these tests, the safe value was considered as one thousandth of an ampere.

Nozzle pressure had little effect on the data. However, the table was based on 100 psi. Various water sources were used in the tests, including untreated river water brought in by tanker.

The setup has been used for demonstrations to more than 700 utility operating people and municipal fire fighters, in which spectators have been given a chance to man the nozzle themselves to see that no ill effects resulted.

Said Hunt, "Many skeptics came, but very few remained that way."

Lessons learned have been successfully applied in extinguishing many crossarm fires on wooden utility poles carrying energized circuits of 34,500 and 69,000 volts.

---

#### SAFETY TABLE FOR ELECTRICAL FIRES

<u>Size of hose line</u>	<u>Type of minimum safe</u>	
	<u>Stream</u>	<u>Distance</u>
1-1/2, 2-1/2-inch	Fog	10 feet
1-1/2-inch	Straight	20 feet
2-1/2-inch	Straight	30 feet
1-1/2-inch	Foam	35 feet

Note: Approach distances are for a man holding a nozzle with 100-psi pressure and an electrical circuit energized at a maximum of 81,000 volts.

## FRAMEWORK FOR MANAGEMENT DECISIONS

### SYSTEMS SAFETY MANAGEMENT IN THE DEPARTMENT OF THE INTERIOR

Early in 1965, a revolutionary concept in accident prevention was developed to furnish management of the Department of the Interior with a new kind of audit tool. It is called the "Safety Management Information System" (SMIS). By changing the fundamental concept of safety management, data extracted from reports of performance errors labelled as "accidents" is fed into an automated system to identify, quantify, and place a dollar value on ineffective management.

Traditionally, responsibility for accident loss control has been centered about the line manager. However, under systems safety management, the supervisor's role in this responsibility is no greater than that of any other line or staff manager at any organizational level. All managers must be concerned with the effects of their supporting services on waste of manpower, materials and money due to systems deficiencies.

Systems safety recognizes the importance of involving all managers in the promotion of error-free performance. Imperfect performance demands the attention of both line and staff managers if operation is to be efficient; if costs are to be controlled. Accidents are considered synonymous with errors. And errors are one of the expected products of systems deficiencies. Thus, accidents expose errors and each time there is an accidental loss of manpower or cost for property damaged, no matter how small, management is afforded the opportunity to examine its own way of doing business that may be contributing to the reasons for this loss.

The fundamental direction of this new management evaluation technique requires the immediate supervisor (line management representative) to review critically the failures he sees in the system that appear to have "let him down." To do this more effectively, the accident report form (source document) was redesigned. Multiple accident reports were condensed to a single information document to cover any kind of an accident situation involving injury or property damage.

Built into this form are questions dealing with many kinds of managerial inefficiencies. For example: (Personnel Management) breakdowns in supervisory control and training, fitness-for-duty evaluations, opinions of problems due to lack or loss of personnel services; (Property Management) improper maintenance practices and environmental controls, apparent inadequacies in design, construction and purchasing procedures, fitness-for-use problems, opinions of policies and practices related to substandard property



services; (Financial Management) supervisory critique of short-sighted financial considerations; (Legal Management) systems breakdowns related to visitor protection and public safety involving tort claims, and the like.

Questions are designed deliberately to isolate problems related to management shortcomings and not to highlight failures of individuals involved. Supervisory suggestions for reducing accidental waste are extracted daily from thousands of reports, machine processed, and collated for periodic analytical review. Hundreds of thousands of facts sent in from nationwide operations are sorted, like parts of a gigantic jig-saw puzzle, and assembled to reveal pictures of high loss incidents connected with inefficient operation.

Management has now at its fingertips a rapid, simple way to identify its own problems, compute cost-effectiveness, and contribute significantly to its own process of decision-making.

The accident report is no longer solely a document of supervisory and employee failure. It is accepted now as a productive tool for involving managers in the process of self improvement. Operating people have the opportunity to complain about failures in that part of the system which is not contributing well to their work efficiency. Staff managers can appraise continually the value of their supporting services. In short, the safety management information system compliments top management's need for independent day-to-day appraisal of its own effectiveness--by its own employees.

This approach to accident prevention is probably the most critical deviation from traditional loss prevention programs which rely mainly on fault finding with people and using injury statistics to support safety activities. System safety management is aimed at management improvement and uses information about service breakdowns and resultant loss to support that need. Improvement of systems safety management increases opportunity for errorless performance. The reduction of accidental loss follows naturally. Under systems safety management line and staff managers tend willingly to provide and often seek out facts they feel may be related to systems weaknesses. Managers tend firmly to resist and often fail to report facts that they feel may point up their personal failures.

In summary, the results of this unique new profit tool for Interior are self evident. The rate of disabling injuries for the Department has fallen 50 percent in 10 years. Managers are taking action of their problems now that never before were possible to identify and cost out. From accident report data, Interior Department managers

know now what occupations are involved in the greatest numbers of imperfect performance; what equipment is failing the greatest number of times--and the total cost of this operational waste. In addition, managers can evaluate quickly where, geographically and organizationally, this loss is occurring most frequently and why.

Effort expended to correct systems weaknesses can be assessed again and again, at will, to determine, at any point in time, the effectiveness of corrective measures and its cost--and what, if anything, needs to be done in the future to maintain efficient quality (cost and loss) control.

As further evidence of Interior advancements in safety management, the Department was nominated for the President's Safety Award in 1965 and 1966. Honorable mention was received in 1965. The system safety approach to evaluate managerial effectiveness in producing error-free performance is marking the Department as a leader in industry and Government in revolutionary concepts of safety management.

\* \* \* \* \*

A worried-looking man in a florist shop asked for three potted geraniums. "I'm sorry," said the clerk. "We're out of geraniums just now, but we have some nice potted chrysanthemums."

"No, they won't do," replied the man. "I promised my wife I'd water her geraniums while she was away."

\* \* \* \* \*

Three men were laying brick.

The first was asked: "What are you doing?"

He answered: "Laying some brick."

The second man was asked: "What are you working for?"

He answered: "Five dollars a day."

The third man was asked: "What are you doing?"

He answered: "I am helping to build a great cathedral."

Which man are you?

\* \* \* \* \*

# PERSONNEL MANAGEMENT AND ACCIDENT PREVENTION

by

H. V. Pearce  
Chief, Division of Personnel  
Bureau of Mines

before the

Bureau of Mines Annual Safety Meeting  
Conrad Hilton Hotel  
Chicago, Illinois  
October 31, 1968

Several things prompted me to accept the Bureau Safety Engineer's invitation to discuss personnel management's roll in accident prevention with you today. One is the sharp increase in Bureau disabling injuries in '68--and, I assure you, a matter of grave concern to me; the second is the emphasis placed by the President on his Mission SAFETY-70 Program to reduce accidents--certainly, Bureau managers can ill afford to permit the recurrence of preventable accidents that result in senseless waste of manpower and property; and finally, as the Bureau official assigned staff responsibility for directing the safety function, it is only proper that I seek every opportunity to discuss accident prevention activities with you.

In the Bureau of Mines, safety responsibility is not solely that of the line supervisor. Safety is everybody's business from the manager on down. Today's management is working slowly but surely away from viewing accidents as employee-supervisor shortcomings and no longer look entirely to them to find out what is wrong. Instead, it is beginning to look at the accident situation from the top down to find what is wrong with the management system that permits preventable accidents to happen. Attention is now focused on functional management (Personnel, Property, Finance, Legal and Line) to uncover system deficiencies that may contribute to accidents. Safety personnel, as members of the management team, supports managers by providing them with continual analysis, evaluation, and suggested remedies for causes of accidents that have an adverse effect on the value of their services.

Good reporting and good analysis can be of tremendous help to management, if used properly. It can identify problems of training, supervision, placement, health, qualifications, job standards, and other kinds. In identifying and interpreting these problems, the safety man is by no means taking over the manager's prerogatives. He is providing support to the manager.

Personnel management, as a member of the team, has definite responsibility in several areas of the Bureau's safety management. Whether we are talking about recruitment, placement, employee relations, incentive awards, position classification, wage administration, labor relations, or even processing records or reporting, safety has a place. I would like to point out some of these--

First, in the area of recruitment, personnel has responsibility to develop procedures and guidelines that will insure the recruitment of the best qualified employee to perform the work of the Bureau. These standards include educational and medical requirements. Every effort must be made to hire only those persons who meet the standards and are physically capable of performing the duties of their positions without hazard to themselves or others. To assure the success of our efforts in this endeavor, safety managers must work closely with personnel managers, particularly in the area of physical requirements. We must see that pre-employment medical examinations are given to all prospective employees, except those of a strictly sedentary nature. (See BM-PML No. 68-14 (339) for guidelines.)

The person preparing the SF-78, Certificate of Medical Examination, must make sure that the appropriate environmental and functional factors relating to each specific job are circled on the form, and that adequate information as to the hazardous or arduous nature of the position is provided completely and accurately to the physician conducting the pre-employment examination. A copy of the position description, if short, should be enclosed with the SF-78. If the description is long, then a concise summary of it should be furnished. The occupational title is not sufficient for making a reliable medical determination.

When hired, employees should be given orientation on the day they report for duty or as soon as possible thereafter--both general orientation and job orientation. First impressions are usually lasting. Every organization has a character of its own, and every new person who comes to it absorbs its atmosphere, with all its implications for discipline, good housekeeping, and for safety, among other things.

The initial orientation of a new employee is the responsibility of personnel. Where full-time personnel people are not available, the head of the field installation is responsible. Among the required items are accident prevention; employee health and safety requirements; and the reporting of injuries and work hazards. To make the orientation session more meaningful, the material should be slanted toward local accident situation and any conditions revealed through accident analysis that could affect employee safety.

In regard to employee development and training, the Division of Personnel is responsible, through the Assistant Director--Administration, for providing staff assistance to Bureau organizations in



planning, organizing, and inaugurating programs and for establishing and conducting or assisting in Bureau training programs which cross organizational lines. Safety managers can render valuable service by pointing out training needs identified through accident analysis. The Bureau's Driver Examination and Road Testing Program is a good example of a training program developed by Personnel to improve employee driving skills. Training is an important part of manpower utilization. This was never more true than in today's manpower and ceiling situation. It's just good sense to integrate safety into all training.

I read the other day, in an article written by a director of another bureau, that his bureau's safety improvement over a certain period amounted to 14 man-years. Even 1 day is important because time lost due to preventable accidents cannot be recovered.

You will note, I have omitted reference to on-the-job training for any given job that the employee was hired to perform. This type of training is the responsibility of the appropriate line supervisor. He is, or should be, the best qualified to give the necessary training. A quick review of the accident record of his group will tell how well he carries out his safety responsibility and whether he is in need of supervisory training. Here again, on-the-job training begins with the orientation on the first day and is a 365-day proposition. To the new employee--experienced or not--a new job presents a complex problem of personal adjustment. Early instruction--well taught and well understood--may have a marked effect on the employee's attitude toward safety.

Now, let's backtrack for a few minutes. We have hired a person who is well qualified, educationally and physically, for a given position. We have given him proper orientation and thorough on-the-job training. Where do we go from here? Is the job done? --Not by a long shot! Employee work assignments and activities are constantly undergoing change and so is the work environment, both physical and mechanical, in which he operates. And most important of all, the employee himself is undergoing change, both physically and mentally. Herein lies the challenge to our management system. It is here that we must keep abreast of the changes and evaluate and re-evaluate the effect of these changes on our employee health and safety and on our mission objectives. It is here that we must recognize newly created deficiencies and take the necessary measures to rectify them. Some of you have had training in behavioral science. Sometimes I think this kind of training would help us all. For example, what causes an employee to act as he does? How can we influence his ideas and attitude toward safety? How does change affect these attitudes?

Now, changes in work activities can be countered with changes in procedures and work practices. Changes in work environment and equipment can be resolved through engineering design and control but change that affects employee health is another matter.

In Personnel, we believe we have recognized many of the work situations that could adversely affect the health and safety of our employees and have established some controls to counteract them. For example, we have defined hazardous and arduous employment; we have pointed out some potentially hazardous and arduous activities. We have assigned responsibility. We have prescribed procedures for determining and recording hazardous and arduous duties. We have set up special pre-employment medical examination requirements for coal mine inspectors and for employees who work with radioactive materials, beryllium, and heavy liquids. Requirements have also been established for periodic physical examinations for these employees and for others engaged in special activities.

It is Bureau practice to employ or continue in employment only persons who meet prescribed standards and are physically and mentally capable of performing the duties of their positions efficiently and without hazard to themselves or others. However, the practice must be applied within the bounds of reason. Upon request, a fitness-for-duty examination can be arranged when there are indications that an employee's performance or adjustment in his position is being affected adversely by ill health or some physical deficiency. Such situations become quite delicate at times and require diplomacy and tact. Finally, we have established re-examination requirements for reassigned or transferred employees whose new duties entail increased physical demands or exposure to a greater range of environmental factors.

Another personnel-management responsibility is the area of health services programs. The President has expressed his desire that Federal employees be provided with model occupational health services. These services include the prompt attention to on-the-job illness and injury; education in health maintenance and physical examinations; disease screening examinations; and immunizations. Many of our employees are already covered by such programs and the number is growing each year. I look forward to 100 percent coverage of all Bureau employees in the future. Information regarding a health services unit may be obtained from the Chief, Branch of Employee Relations and Development, or from the Bureau Safety Engineer, who has cooperated in these matters.

Personnel management is also deeply involved in employee-management cooperation programs. These programs are designed to enhance employee participation in matters affecting their working conditions. Safety is one of these matters of special importance to the agencies and the employees. As some of you know, a number of proposals relating to employee safety have been submitted for negotiation. We expect more.

I hope this review of some of the functions of Personnel will help emphasize that Personnel has a vital interest in safety activities

as do other members of the management team. Strengthening safety efforts within the Bureau of Mines through cooperation of functional managers can mean a safer and more healthful work environment for all our employees. Let's have more of it!

\* \* \* \* \*

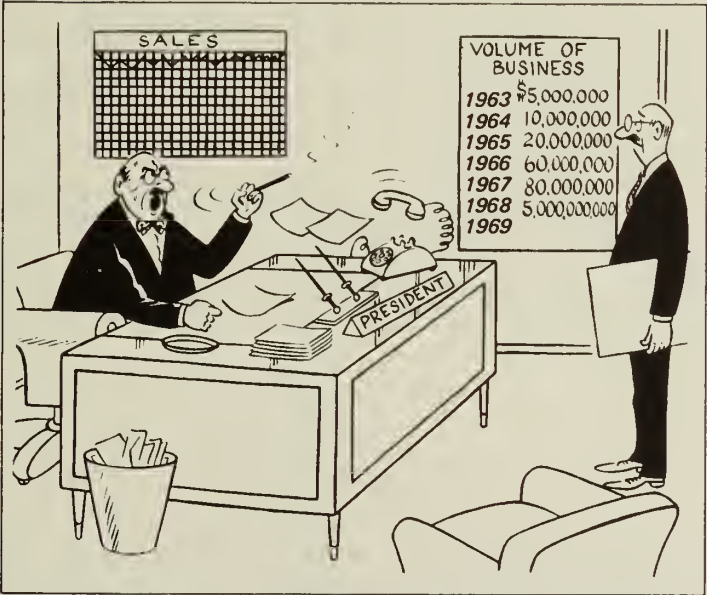
Golfer (to pardner): Look at the girl dressed like a man; it's disgraceful. What are her parents thinking of?

Partner: That girl, sir happens to be my daughter.

Golfer: Oh, I beg your pardon, I didn't know you were her father.

Partner: I'm not; I'm her mother.

\* \* \* \* \*



"You call yourself a plant manager? You haven't produced a winning bowling team in four years!"

# VEHICLE SAFETY

## LEGAL ASPECTS OF THE UNBUCKLED SEAT BELT

Based upon recent decisions, it is apparent that the Courts have accepted the fact that seat belts can prevent injury and that people riding in automobiles can protect themselves in advance against the hazards of an accident. More important, several recent Court decisions have found that the failure of a plaintiff to use his seat belt, under the circumstances involved, constituted failure to exercise such due care as a person of ordinary prudence and reason would have exercised under similar circumstances. As a result, the plaintiffs were not awarded damage for injuries which could have been prevented by use of a seat belt. In the cases reviewed, the percent of damages disallowed were substantial: 95 percent in Vernon vs. Droeste.

Consequently--and if for no other reason--from the standpoint of liability it would appear to be prudent to fasten your seat belt in order to guard against accidental injuries which could have been prevented, or the severity of which could have been reduced, by its use. In other words, if you sustain an injury which could have been avoided, or the severity of the injury reduced, had you taken the simple precaution of fastening your seat belt, you may be barred from recovering damages for your injuries. In this manner, the law hopes to advance the cause of safety and hopefully encourage individuals to "buckle up."

While the law appears equitable and sound, particularly its intent to encourage the individual to protect himself, it seems to us that there is a more compelling reason for not sitting on our seat belts--namely the desire to avoid serious injury or death. Our advice: BUCKLE UP.

\* \* \* \* \*

## PROTECTION

A small boy had been naughty and had been reprimanded. His mother told him he must take a whipping. He fled upstairs and hid in a far corner under a bed.

When the father came home, the mother told him what had happened. He went upstairs and proceeded to crawl under the bed toward the youngster.

Excitedly the boy whispered, "Hello Pop, is she after you too?"

\* \* \* \* \*



# SAFETY PERFORMANCE RECORD

## CUMULATIVE QUARTERLY REPORT GOVERNMENT FORCES

1st QUARTER, 1962

PERIOD FROM JANUARY 1, 1962... THROUGH... March 31, 1962

REPORTING OFFICE	NUMBER OF EMPLOYEES	MAN HOURS	DISABLING INJURIES		DAYS LOST	FREQUENCY RATE	SEVERITY RATE
		CUMULATIVE THIS YEAR	CUMULATIVE THIS YEAR	FATAL *	CUMULATIVE THIS YEAR	CUMULATIVE THIS YEAR	CUMULATIVE THIS YEAR
Washington Office	328	160,064					
Denver Office	1,374	686,772					
REGION 1							
Boise Regional Office	182	74,166					
Central Snake Project	45	18,606	1		47	53.7	2,526
Chief Joseph Dam	37	17,308					
Columbia Basin Project	684	378,184	1		9	2.6	24
Green Springs Powerplant	2	1,073					
Rungy Horse Project	46	19,350					
Lower Columbia Development Office	55	23,452					
Lower Teton	7	2,608					
Minidoka Project	69	35,237					
Snake River Development Office	60	29,058					
Third Powerplant Construction Office	188	86,146	1		2	11.6	23
Upper Columbia Development Office	44	19,815					
Wild Horse Dam	5	5,282					
Yakima Project	28	13,315					
Totals & Averages	1,452	724,600	3		58	4.1	80
REGION 2							
Sacramento Regional Office	570	311,659					
Regional Drill Crew	41	20,008	1		16	50.0	800
Auburn-Folsom South Unit	187	91,726					
Cachuma Operations Field Branch	3	1,312					
Central Coast Dev. Field Branch	3	1,552					
Folsom Field Division	74	38,020					
Fresno CVP Construction Office	140	57,829					
Fresno Field Division	140	69,288					
Klamath Project Office	17	9,613					
Lahontan Basin Projects Office	62	23,436					
Napa Development Field Branch	1	1,488					
Sacramento Valley CVP Constr. Office	119	60,607					
San Luis Unit CVP Construction Office	151	76,522					
Shasta Field Division	144	73,208					
Solano Operations Field Branch	3	1,688					
Tracy Field Division	160	80,738					
Upper North Coast Dev. Field Branch	4	1,984					
Totals & Averages	1,821	920,592	1		16	1.1	17
REGION 3							
Boulder City Regional Office	196	93,280					
Boulder Canyon Project	140	69,308					
Dixie Project Office	5	2,308					
Lower Colorado River Project	194	97,137					
Mead Construction Office	28	12,960					
Parker-Davis Project	322	178,580					
Phoenix Development Office	93	44,640					
Transmission Lines Office	8	5,536					
Southern California Development Off.	21	7,988					
Southern Nevada Water Project	76	37,713					
Yuma Projects Office	129	65,402					
Totals & Averages	1,212	615,852					
REGION 4							
Salt Lake City Regional Office	214	99,402					
Central Utah Project	166	82,680					
CRSP Power Operations Office	268	141,183	1		2	7.1	14
Curecanti Unit	80	34,365	1		5	29.1	145
Durango Projects Office	22	11,222					
Grand Junction Projects Office	46	23,712					
Logan Development Office	9	4,672					
Lyman Project	25	10,754					
Upper Green River Development Office	20	10,024					
Weber Basin Project	22	12,528					
Totals & Averages	872	430,542	2		7	4.6	16
REGION 5							
Amarillo Regional Office	97	48,232					
Albuquerque Development Office	32	14,893					
Austin Development Office	46	23,896					
Canadian River Project	2	838					
Lower Rio Grande Project	2	976					
Middle Rio Grande Project	231	104,923					
Navajo Project	75	38,744	1		5	25.8	129
Oklahoma City Development Office	20	9,002					
Pecos River Project	11	4,723					
Rio Grande Project	211	101,810					
San Juan-Chama Project	74	40,615					
Totals & Averages	789	388,652	1		5	2.6	13
CONSOLIDATED TOTALS							
TOTALS LAST YEAR (19 )							

\*FATALITIES INCLUDED IN TOTAL DISABLING



# SAFETY PERFORMANCE RECORD

## CUMULATIVE QUARTERLY REPORT

### GOVERNMENT FORCES

1st QUARTER, 1969.

PERIOD FROM JANUARY 1, 1969 THROUGH March 31, 1969

[illegible]

U.S. 925-100

# SAFETY PERFORMANCE RECORD

## CUMULATIVE QUARTERLY REPORT

### CONTRACTOR FORCES

1st QUARTER, 1969.

PERIOD FROM JANUARY 1, 1969... THROUGH... March 31, 1969...

REPORTING OFFICE	NUMBER OF EMPLOYEES	MAN HOURS	DISABLING INJURIES		DAYS LOST	FREQUENCY RATE	SEVERITY RATE
			CUMULATIVE THIS YEAR	CUMULATIVE THIS YEAR			
REGION 1							
Chief Joseph Dam	32	10,985	1		21	91.0	1,912
Columbia Basin Project	209	38,979	1		4	25.7	103
Green Springs Powerplant		256					
Lower Teton	3	1,150					
Minidoka Project	5	3,057					
Third Powerplant Construction Off.	636	283,385	3		235	10.6	829
Wild Horse Dam	11	3,750					
Yakima Project	28	1,200					
Totals & Averages	924	342,762	5		260	14.6	759
REGION 2							
Auburn-Polsom Unit CVP Constr.Off.	95	21,670					
Fresno CVP Construction Office	162	56,025					
Fresno Field Division	24	5,573					
Lahontan Basin Project Office	4	198					
Sacramento Valley CVP Constr. Off.	80	15,537					
San Luis Unit CVP Constr. Office	160	48,933					
Tracy Field Division	4	190					
Totals & Averages	532	155,120					
REGION 3							
Boulder Canyon Project	11	1,264					
Lower Colorado River Project	24	7,155					
Mead Construction Office	39	17,959	2		34	111.4	1,893
Parker-Davis Project	15	5,928					
Southern Nevada Water Project	228	92,216	2		198	21.7	2,147
Yuma Projects Office	39	14,602					
Totals & Averages	356	139,124	4		232	28.8	1,668
REGION 4							
Central Utah Project	145	68,860					
CRSP River Operations Office	7	887					
Guerandi Unit	42	12,877	1		2	77.7	155
Orange Project Office	5	1,945					
Weber Basin Project	12	4,235					
Totals & Averages	212	88,804	1		2	11.3	23
REGION 5							
Amarillo Regional Office		1,162					
Canadian River Project	15	7,586					
Navajo Project	19	10,180					
Pecos River Project	23	10,153					
San Juan-Chama Project	451	254,960	1		16	3.9	63
Totals & Averages	508	284,041	1		16	3.5	56
REGION 6							
Missouri-Oahe Projects	102	37,955					
Missouri-Souris Projects	6	1,895					
Riverton Project	7	1,500					
Upper Missouri Projects	53	22,906					
Yellowtail Construction Office	43	25,407					
Totals & Averages	211	90,663					
REGION 7							
Fryingpan-Arkansas Project	65	52,272	1		24	19.1	459
Glen Elder Unit	24	11,770					
Kansas River Projects	28	7,900					
North Platte River Projects	26	8,813					
Totals & Averages	143	80,755	1		24	12.4	297

\*FATALITIES INCLUDED IN TOTAL DISABLING







# "WHERE ARE YOUR SAFETY GOGGLES?"



THE CONSTRUCTION SAFETY STANDARDS  
HELP PREVENT ACCIDENTS, FOLLOW  
THEM !

MISSION  
SAFETY

70

# RECLAMATION SAFETY NEWS



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*Second Quarter 1969*



UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF RECLAMATION  
OFFICE OF CHIEF ENGINEER



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Front Cover Photo: The lake behind East Canyon Dam is attracting many boaters and swimmers. Water skiing is a popular pastime on this reservoir in Utah. Three expert water skiers are shown enjoying the sport in front of the dam. Photo P526-400-11073-I.

SAFETY NEWS is published quarterly by the Office of  
Chief Engineer, Bureau of Reclamation,  
Denver, Colorado, in the interest of  
accident prevention.

# BUREAU SAFETY PERFORMANCE

## 1969 CUMULATIVE ACCIDENT RECORD

January 1 - June 30, 1969

### A. GOVERNMENT FORCES

<u>Region</u>	<u>Injury index*</u>	<u>Frequency rate</u>	<u>Severity rate</u>	<u>Vehicle accident rate</u>
Region 6	0.1	1.1	11	2.8
Region 2	0.3	2.1	14	2.5
Region 5	0.5	2.5	19	3.0
Region 4	0.5	3.4	14	1.9
Region 3	1.4	1.6	86	1.9
Region 1	2.8	2.7	104	4.3
Region 7	<u>409.0</u>	<u>3.2</u>	<u>12,781</u>	<u>2.0</u>
Totals to Date	24.0	1.9	1,265	2.6
Totals 1968	0.4	1.1	33	2.6

\*Injury index is equal to frequency rate times severity rate divided by 100.

### B. CONTRACTOR FORCES

<u>Region</u>	<u>Injury index</u>	<u>Frequency rate</u>	<u>Severity rate</u>	<u>Fatal injuries</u>
Region 2	0.3	2.1	15	0
Region 6	10.0	11.4	88	0
Region 5	10.4	6.8	153	0
Region 7	160.8	31.4	512	0
Region 3	215.3	22.5	957	0
Region 1	966.9	11.7	8,264	1
Region 4	<u>4,807.8</u>	<u>24.6</u>	<u>19,544</u>	<u>1</u>
Totals to Date	589.9	13.0	4,538	2
Totals 1968	621.0	12.2	5,090	6

### C. RECLAMATION CIVILIAN CONSERVATION CENTERS

Frequency rate: 2.0  
 Severity rate: 7  
 Vehicle accident rate: 25.2



## LOST TIME ACCIDENT ANALYSIS

Government Forces - 1969  
Second Quarter

Cumulative to Date:  
June 30, 1969

### A. ACCIDENT CLASSIFICATION

<u>Description</u>	<u>No.</u>	<u>Days lost</u>
Aircraft (helicopter)	2	12,000
Cave-in	1	6
Vehicle	4	96
Flash burn	1	2
Handling materials and equipment	4	113
Falls of persons	6	214
Falling objects	<u>1</u>	<u>10</u>
Total	19	12,441

### B. OPERATIONAL SUMMARY

<u>Operation</u>	<u>Man-hours</u>	<u>No. of accidents</u>	<u>Days lost</u>	<u>Frequency rate</u>	<u>Severity rate</u>
Administration, Clerical and Design	4,200,165	2	6,030	0.5	1,436
Construction	1,505,648	7	112	4.6	74
Investigation	1,073,166	3	31	2.8	29
Power O&M	1,963,797	6	6,221	3.1	3,168
Irrigation O&M	<u>1,089,049</u>	<u>1</u>	<u>47</u>	<u>0.9</u>	<u>43</u>
Totals	9,831,825	19	12,441	1.9	1,265

\* \* \* \* \*

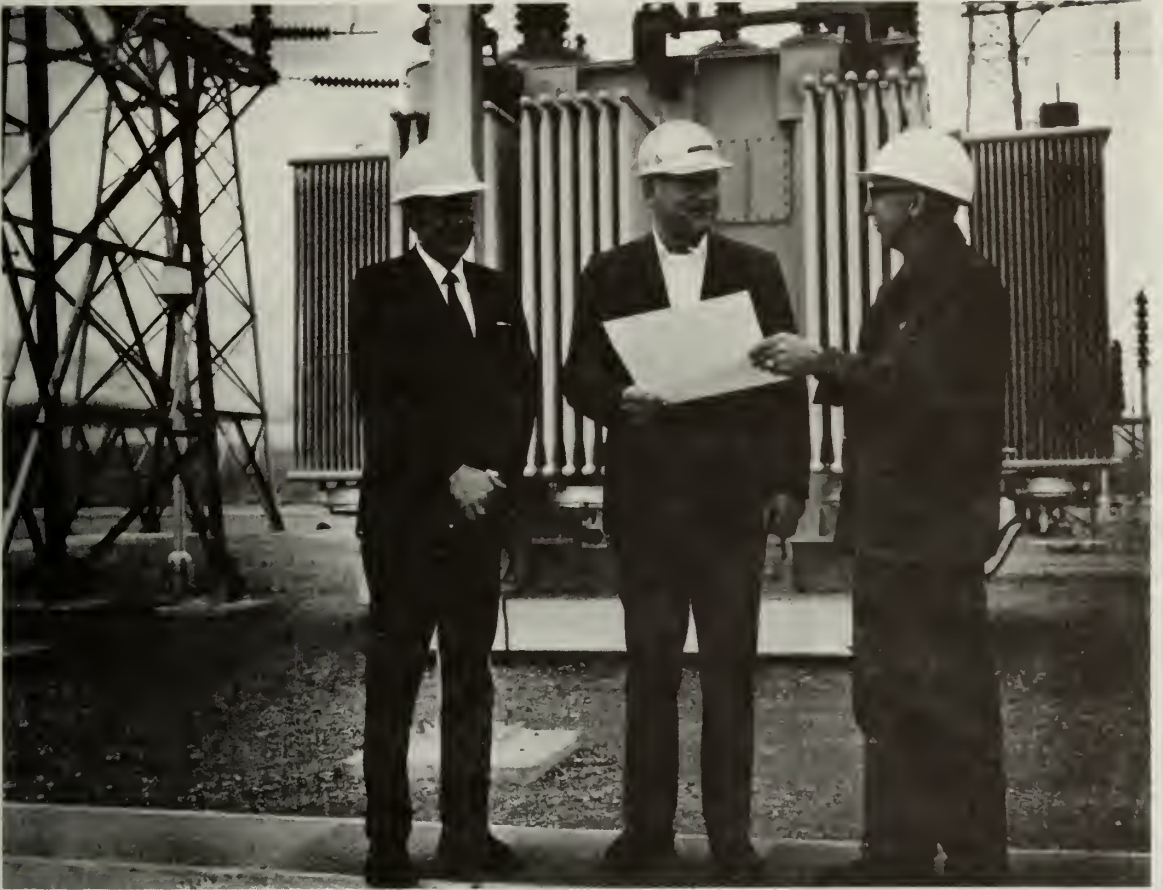
### REGION 4 SAFETY OFFICER NAMED TO COMMITTEE

R. J. Searle, Region 4 Regional Safety Officer, has been designated by the National Safety Council as its representative on the United States of America Standards Committee. Standards developed by the committee are used as guides by manufacturers, Government agencies, industry, and the general public to determine if working environment, equipment, and structures are adequately constructed and operated to insure safety of employees, operators, and the public.

\* \* \* \* \*

# SAFETY AWARDS

CONSTRUCTION SAFETY AWARD  
PRESENTED TO ETS-HOKIN CORPORATION



At the Midway Substation, located just west of Highway No. 85 between Colorado Springs and Pueblo, the Bureau of Reclamation Construction Safety Award was presented to Ets-Hokin Corporation for construction of the substation without a single lost-time accident after 30,393 man-hours of exposure. The certificate was accepted by Mr. Hugh Martin (pictured above, center), Project Manager for Ets-Hokin Corporation in the presence of Mr. Harold Frager, Senior Vice President of the Corporation. Presentation was made on behalf of Construction Engineer H. E. McInnis by Field Engineer Howard M. Burr (pictured above, right). Photo PX-D-64588NA.

## REGION 5 RECEIVES POWER AWARD

Region 5 won the first "Commissioner's Award of Merit" for error-free performance in power operations as a result of working through fiscal year 1968 without an operating error. The award was established to recognize high quality in the operation of Bureau powerplants and electric transmission systems.

The Region 5 power system is located on the Rio Grande Project and includes a hydroelectric powerplant at Elephant Butte, New Mexico, and 491 miles of 115-kilovolt transmission line in the south-central portion of the state.

Pictured below are, left to right: Leon W. Hill, Regional Director; William H. Keating, Chief, Division of Power, Washington, D.C.; Labon Backer, Chief, Power Division, Rio Grande Project; William D. Leigon, Chief, Power Field Branch, Rio Grande Project. Elephant Butte Dam and Powerplant are in the background. Photo PX-D-64589NA.





DEPARTMENT OF THE INTERIOR  
CERTIFICATE OF SAFETY ACHIEVEMENT

Regional Director Leon W. Hill is shown below presenting the Department of the Interior Certificate of Safety Achievement to W. D. Leigon, Chief, Elephant Butte Power Branch, Rio Grande Project. The certificate was presented to branch employees for having driven 1,014,743 miles without a reportable accident between April 21, 1964 and August 23, 1968. Other persons pictured from left to right are: Aubrey V. Ruple, Regional Safety Officer, Amarillo, Texas; W. H. Keating, Chief of the Power Division, Washington, D.C.; Leigon, Hill, and Labon Backer, Chief of the Power Division, Rio Grande Project, El Paso, Texas. Photo PX-D-64590NA.



If you don't want your children to hear what you are saying, pretend you're talking directly to them.

Advertisement in personal column of university town newspaper:  
"Sweet old lady wishes to correspond with young male student, preferably her son."



## SOUTH PLATTE RIVER PROJECTS EMPLOYEES RECEIVE NATIONAL SAFETY COUNCIL SAFE DRIVER AWARDS TOTALING 189 YEARS

Pictured below are part of the 83 project drivers who received safe driver awards. This group, from the Loveland, Colorado area, represents 189 years of safe accident-free driving. Photo P245-713-4236 NA.



## MEAD CONSTRUCTION OFFICE EMPLOYEES RECEIVE NATIONAL SAFETY COUNCIL SAFE DRIVER AWARDS TOTALING 72 YEARS



Pictured at the Mead Substation, Nevada, is Regional Safety Engineer Frank J. Kouba, presenting 14-year Safe Driver Award to David H. Larsgaard, Construction Engineer. Other safe driver award recipients shown left to right are: Harold Cahalan, Harold Beery, Gary Frey, Vernon Yerton, Fred Heinle, and A. M. (Tex) Johnston. Photo PX-D-64591NA.

\* \* \* \* \*

# FROM THE FIELD

## IMPLEMENTATION OF AN IMPROVED SAFETY PROGRAM ON THE FRYINGPAN-ARKANSAS PROJECT

Project Manager  
James L. Ogilvie  
welcoming the  
130 Reclamation  
employees to the  
Safety Conference  
held at the Ramada  
Inn, Pueblo,  
Colorado. Photo  
P382-706-8162A.



The Bureau of Reclamation's Fryingpan-Arkansas Project held a 3-1/2-day safety conference, March 3 through 6, 1969, at the Ramada Inn in Pueblo, Colorado. The conference got underway with this urging by Project Manager J. L. Ogilvie: "Each to listen--participate--learn; to be constantly reminded tomorrow, or in a year, of applications gained here." Mr. Ogilvie also stated that the primary objective of the conference was to advance the work on the Fryingpan-Arkansas Project with the manpower, equipment, and funds available as diligently, efficiently, and SAFELY as possible; and equally important, provide each participant an opportunity to learn and grow in his job for his own betterment and well-being.

Participants in the conference included Fryingpan-Arkansas Project employees, Region 7 Office employees, and employees from other Reclamation associated offices.

The keynote address was given by Dr. James Barrett of Southern Colorado State College. Other speakers were H. S. Latham, Chief Safety Engineer, Chief Engineer's Office, "Employee Indoctrination and Instruction"; Major Michael Grady, U.S. Air Force Academy, "Motivation and Leadership"; Dr. Robert L. Able, Associate Professor of Management, University of Colorado, "Personal Involvement"; Captain Russell DeSalvo, Colorado State Patrol, "Highway Safety"; C. S. Merman, Assistant to Regional Director, Region 7, "Understanding the Management Process"; R. A. McRae, former Safety Engineer, CF&I Steel Corporation, "Communicating Safety"; Don Young, Regional Solicitor's Office, "Contract Claims"; and Fred Lippold, Chief Engineer's Office, "Contract Administration."

Mr. Don Young  
of the Regional  
Solicitor's Office,  
Denver, Colorado,  
who presented a  
discourse on "Con-  
tract Claims."  
Photo P382-706-  
8164NA.



At the banquet held the evening of March 5 at the Ramada Inn, Major Allen G. Myers and Major Phillippe O. Bouchard from the U.S. Air Force Academy gave a talk, accompanied by visual aids, on Viet Nam. The banquet was attended by conference participants, other project employees and their families.

On the last day of the conference, panels on five case studies were presented which involved a variety of safety problems. Each case study was moderated by a Fryingpan-Arkansas Project employee and the panels were made up of various Reclamation employees.

Project Manager Ogilvie wrapped up the conference with a brief statement pointing out that the meeting had covered two general

fields: (1) people behavior and actions, and (2) safety practices. Ample evidence of the first was presented by the speakers who emphasized the personal gains and job satisfactions that can result from self analysis of our actions, due consideration of the actions of others, and complete communication understanding. The principal overriding fact throughout the meeting highlighted the importance of good communications, written or spoken, in every facet of our work and particularly emphasized this importance as we continually sell SAFETY.

\* \* \* \* \*

## FALLS AT HOME

The housewife who stands on a chair or box to hang curtains is inviting a fall. Accidental falls at home injure and kill thousands of Americans each year. These falls claimed the lives of 11,900 in 1965, the last year such figures are available.

To avert these mishaps, the American Insurance Association recommends the following safety rules:

Use a balanced ladder to stand on -- never a chair, box or bench.

Don't let stairway rugs or pads become loose or frayed.  
Keep throwings firmly anchored down.

Don't apply so much polish on floors that they are slippery.

Equip your bathtub with a good handhold and a nonskid mat.

\* \* \* \* \*



# VEHICLE SAFETY

Region 5 Regional Office, Amarillo, Texas--NSC Defensive Drivers' Refresher Course: Regional Office personnel recently attended a National Safety Council Defensive Drivers' refresher course. The 8 sessions were presented in 4 days to 64 employees.

## HOW LONG WILL YOUR SEAT BELT LAST?

Safety belts have been standard equipment in the front seats of new car models since 1964, so some are more than 5 years old. What is their life expectancy - how often should safety belts be replaced?

There's no rigid rule. If at any time the webbing or the hardware becomes damaged, it loses its total ability to protect and it should be replaced immediately. Periodic inspection is necessary. Here's how to do it yourself:

1. Examine sections of webbing that make contact with metal hardware. Continued use can abrade the woven material and could lead to weakening of the fabric.
2. Check metal hardware for cracked or damaged areas.
3. Check all spring mechanisms for proper functioning.
4. Check for webbing slippage at attachment points over cams or bars.

A defect in a safety belt may or may not alter its effectiveness in a crash. Since that can't be predicted, any obviously defective belt should be replaced with a new one.

## HOW TO BUCKLE UP

You're sold on safety belts. You fasten yours just as soon as you sit down in the car. For best results:

1. Wear the belt snugly over the hip bones.
2. Before buckling up, slide the front seat back as far as you can and still be comfortable behind the wheel.
3. If belts aren't the retractable type, tuck the loose end out of the way so it doesn't become tangled in the steering wheel.

\* \* \* \* \*

# WATER SAFETY

## Region 3, Boulder City, Nevada--Water Safety Leaders in Region 3:

Frank J. Kouba, Regional Safety Engineer, Region 3, Boulder City, Nevada, was reappointed Regional Vice President by the National Water Safety Congress at its recent meeting held in Miami Beach, Florida. Photo PX-D-64592NA.



As a member of the Awards Committee, Mr. Kouba recommended several individuals and organizations for awards in recognition of outstanding water safety programs. As a result of his efforts, all were approved. The National Water Safety Congress "Presidential" Citation was presented to William Stadler, Public Information Officer, Imperial Irrigation District, El Centro, California, and Mrs. Harvey D. Taylor, President, Yuma Area Water Safety Council, Yuma, Arizona. The National Water Safety Congress "Award" was made to the Lake Mead National Recreation Area, National Park Service, Boulder City, Nevada, and the National Water Safety Congress "Certificate of Appreciation" was presented to the Lake Mohave Resort, Inc., Katherine Landing, Arizona.

Region 2, Sacramento, California--Regional Water Safety Conference:  
Region 2's Second Regional Water Safety Conference was held in Sacramento on March 25, 1969. The conference was attended by approximately 145 representatives from the Bureau, agencies administering recreation on Bureau reservoirs, and other agencies interested in water safety programs. The Red Cross was particularly active in attendance and participation.

The conference goal was accident prevention through effective water safety programs. It provided an opportunity for those in attendance to discuss water safety programs for the public, to exchange ideas on accident prevention, and to share experiences and ideas on improving and extending water safety programs.

## BOATING ACCIDENTS - 1968

The U.S. Coast Guard reports that there were 4,195 boating accidents reported for calendar year 1968 involving some 5,427 vessels. Of these vessels, 1,092 were involved in 1,062 boating accidents which resulted in 1,342 fatalities. There were 1,150 vessels involved in 879 accidents resulting in 1,284 personal injuries. And 3,185 vessels were involved in 2,254 accidents accounting for \$6,631,600 in property damage.

Loss of Life. Vessel capsizings have consistently accounted for more of the lives lost in boating accidents each year than any other type of casualty. The great majority of capsizings are attributed to some fault of the operator in his handling of the vessel. Chief among these faults are improper loading or overloading of the boat, ignoring weather warnings and proceeding under unfavorable weather conditions, and operating in waters which exceed the limits of the craft and/or the operator's training or experience. Falls overboard and vessel sinkings were the second and third major types of casualties resulting in boating fatalities.

Personal Injuries. About half of the vessels reported in accidents were involved in collisions. These collisions accounted for most of the personal injuries. The principal cause of a vessel colliding with another vessel or with a fixed object is the failure of the operator to maintain a forward lookout. The increasing popularity of water skiing has contributed to this safety problem. Fires and explosions resulted in the second largest number of personal injuries.

Property Damage. Fires and explosions continue to account for the greatest amount of property damage. Vessel collisions accounted for the second largest amount of property damage. More than 60 percent of the cases of fires and explosions where the cause of the accident could be determined were due to some fault of the operator, such as improper installation or maintenance of engine or equipment, disobedience of safe fueling practices, and lack of operating experience.

## LIFESAVING DEVICES

There were 1,203 drowning victims for 1968 as a result of boating. Of these, 51.8 percent were known to have had lifesaving devices available, and 84.3 percent of these victims did not use the available devices or used them improperly. Of the drowning victims, 27.2 percent were known not to have had lifesaving devices available; for 21.0 percent of the victims, it is unknown whether a lifesaving device was available.

## A DOZEN BASIC BOATING SAFETY RULES

The following common sense safety suggestions could greatly reduce the boating accident rate if followed by all boatmen under appropriate circumstances.

1. Know your boat, what it can do and what it can't do, how it will handle in all kinds of weather. Knowing load capacity is very important. Capacity plates placed in conspicuous view of the operator serve as a reminder of the capacity limitations of the boat, thereby dissuading overloading. The boat should have positive buoyancy sufficient to support the passenger capacity when swamped or capsized. Don't overpower your boat.
2. Load your boat properly, making sure that the weight is properly distributed. On small craft, standing up, shifting weight, and sitting on the bow or gunwale can be very dangerous practices.
3. Leave a Float Plan with a friend or relative before you depart on a boating outing. The Float Plan should include the following information: (a) where you intend to cruise; (b) description of your boat; (c) communications equipment you have available; (d) list of people accompanying you; (e) estimated time of return; and (f) alternate plans in case of bad weather or an emergency.
4. Life vests or preservers should be worn by all occupants when boating conditions are hazardous and by children and non-swimmers at all times. Besides all safety equipment required by law, some desirable extras should be carried - a good first-aid kit, paddle or oars, distress flares, a pump or bailer, anchor and line, boat hooks, a transistor radio, drinking water and extra fuel.



5. Keep a good lookout. Failure to do so is the cause of most collisions. There should be a second person aboard to act as a lookout when towing a skier.
6. Operate at safe speeds. Watch your wake. You are responsible for damage caused by it to other boats or waterfront facilities. Give swimmers, skiers and divers a wide berth.
7. Know and obey state and federal boating laws. Know the marine traffic laws, the "Rules of the Road," and obey them.
8. Respect the weather. Listen to marine forecasts, and heed weather warnings.
9. Be familiar with emergency signals and procedures and familiarize your passengers with them. Conduct life preserver drills. In most cases when a boat capsizes, the occupants should stay with the boat. Even alleged good swimmers attempting to swim to safety have succumbed before reaching shore. Also, you should be more easily located by a search plane or boat. Using good judgment and avoiding panic would prevent or minimize the serious consequences of a boat accident.
10. Be defensive against causes of fires or explosions. Three steps are necessary to reduce the chance of flammable vapors collecting in your boat: (1) observe all safety precautions in handling volatile fuels, (2) have a safe fuel system installation and maintain it, (3) have a good ventilation system to conduct fresh air into each fuel and engine compartment and to remove gases from the bilges to the open atmosphere.
11. Keep your boat neat and in prime operating condition. Check safety equipment and carry spare parts, and keep them dry and in good condition.
12. Don't operate a boat if intoxicated.

## SUMMER SUMMARY

When vacation is over, you'll often find,  
As you give it a backward look,  
You could have made out with half the clothes  
And twice the money you took.

Flaming Gorge Field Division--Utah-Wyoming



The construction of the Flaming Gorge Dam on the Green River in northeastern Utah changed this once muddy river into a clear, cold trout stream. It has become increasingly popular with fishermen in the area because of the numerous large rainbow trout found below this Bureau of Reclamation structure. Float trips are popular in the 7-mile stretch between Flaming Gorge Dam and Little Hole. The rubber rafts used for this trip are launched just below the dam to float through a very scenic section of the country along the Green River. Photo P591-400-6284.

Flaming Gorge Field Division--Colorado River Storage Project--  
Utah-Wyoming



The Cedar Springs Marina near Flaming Gorge Dam on Flaming Gorge Reservoir is the start of many excursions by boaters on the scenic lake. The boat launching ramp and docks nearby are typical of the many facilities available at different points in the Utah and Wyoming sections of this lake. The Bureau of Reclamation-constructed Flaming Gorge Dam backed up the waters of the Green River to form the lake which has become extremely attractive to those who enjoy water sports. Photo P591-400-6265.

# RECORD OF PUBLIC DROWNINGS

January 1, 1969, through June 30, 1969

## Bureau-operated Facilities:

Dams	2
Canals	16
Reservoirs	--
Total	<u>18</u>

## Facilities Operated by Others:

Irrigation and Water Districts	10
State or County (Recreational)	11
Total	<u>21</u>

## Summary of Total Drownings During Period:

### By Operating Agency:

Bureau of Reclamation	18
Irrigation and Water Districts	10
State or County (Recreational)	11
Total	<u>39</u>

### By Type of Facility:

Dams	4
Canals	23
Reservoirs	12
Total	<u>39</u>

### By Activity:

Swimming	15
Boating	3
Fishing	5
Fell into water	5
Other	11
Total	<u>39</u>

### By Age:

Under 12 years of age	7
From 12 to 25	17
From 25 to 50	9
Over 50 years of age	6
Total	<u>39</u>

\* \* \* \* \*



## WIRE ROPE SAFETY

--From the National Safety Council's  
Construction Safety Release No. 75

1. Wire rope slings should be protected against weather, solvents, high temperatures and chemicals.
2. The following temperatures should not be exceeded when using wire rope slings: Fibre - core 212 F. (Higher temperatures damage core). Independent wire rope core - 400 F. (Higher temperatures damage steel).
3. Knots permanently damage wire rope slings and must not be used.
4. Protect wire rope slings from sharp corners of load by increasing corner radius with corner irons, blocks, bagging or lagging.
5. Each leg of wire rope sling should be secured at the hook to prevent reeving of the sling on hook.
6. Single leg wire rope slings should not be used alone because load might spin, unlaying rope and allowing splice to pull out.
7. Never make a complete turn of wire rope around crane hook. The sharp radius damages the sling.
8. Wire rope slings should be checked for:
  - a. Broken or cut wires or strands.
  - b. Rust and corrosion.
  - c. Kinks and doglegs.
  - d. Damage to swayed fittings.
  - e. Broken seizing wire.
  - f. Other signs of damage or abuse.
9. Avoid bending the eye section of wire rope slings around corners. Bending weakens the splice or swaging.
10. When making choker hitches with wire rope slings a shackle should be used.
11. It is always a good practice to secure heavy or sharp cable protection material such as lagging, blocking, etc., so it does not come loose and fall from the load.

## ON-THE-JOB INSPECTION OF CHAIN HOISTS

On-the-job inspection of chain hoists is mighty important. Many unsafe conditions can develop on the job. We're whistling in the dark if we depend on the hoist to stay in good condition on the job without doing something about it.

Common sense tells us that whenever we spot STRETCHED CHAIN, WORN LINKS, OR OPEN HOOKS, the safest thing to do is to replace them. Why gamble with lives and equipment? Here are some suggestions for on-the-job inspection of chain hoists:

1. Check chain for wear, stretch or damage to links.
2. Check hooks for opening.
3. See that both top and bottom hooks are carrying the load at the hook center and not on the hook tip.
4. Check handwheel action. The handwheel has a back movement (or play) of one to one and a half pockets before the handwheel strikes the check washer lug. If it has to turn three pockets or more, some of the brake parts are worn and need replacing.
5. Check action of hoist. If it lowers hard it usually means lack of lubrication in brake. If you have excessive pull in both directions it can mean lubrication or it may be a bent driving pin.

Many ..... in fact, perhaps most ..... chain hoist defects can be detected and remedied before serious trouble develops.

Thomas J. Laskowski  
Transit Insurance Administrators

\* \* \* \* \*

## THE USE OF LASERS IN THE CONSTRUCTION INDUSTRY

--From the National Safety Council's  
Construction Safety Release No. 69

The number of lasers in use in tunnels and on construction projects is now mounting rapidly. To date, no single standard has been adopted for laser exposure. The state of Illinois has passed laws aimed at reducing the number of laser accidents. Generally, those lasers are excluded where there is a low level energy output where the public health hazard of the laser system is absent or negligible.

The helium-neon gas lasers used in construction are very low-power lasers, because all that is required is a visible beam of light to use as a reference. The intense beam of light provides a precise alignment for laying pipe, leveling, tunneling, grading, plumbing, pile driving and dozens of similar tasks. People work in the presence of intense light sources all the time. Every man in construction knows that he should not stare at a welder's torch. The hazards of low-power lasers should not be overly exaggerated with respect to other types of construction hazards.

Obviously, if the dangers of laser radiation are understood and a safety program initiated in accordance with the dangers, hazardous conditions will be avoided. It is unlikely that the general public or transient personnel would be exposed to hazardous levels if proper precautions are taken. For example, the laser attenuator cap may protect the worker at 200 feet; but if curious bystanders manage to get in close to the laser and peer directly into the beam at 20 feet, injury may result.

The risks for our personnel can be reduced if a few simple rules are followed. Unfortunately, they are sometimes neglected, either through lack of knowledge but more often through carelessness.

### DO

DO Assign only those persons to set up, adjust and operate equipment that are qualified to follow appropriate procedures related to lasers.

DO Provide twist lock connectors and proper grounding for all noncurrent carrying conductive parts of the equipment. Respect laser equipment as you would any other electrical equipment. This aspect of the safety problem must be stressed insofar as the potential electrical hazard is usually greater than that posed by the low-power laser beam itself.

DO Instruct all personnel in areas using lasers with respect to the dangers of the equipment and the laser beam, both direct and reflected.

DO Alert personnel within the vicinity of lasers prior to the using of any laser device in order that they may take precautions to shield or otherwise protect their eyes.

DO Placard danger areas to inform of potential danger those members of the general public or other transient persons who may otherwise be exposed. The placard should warn persons not to stare at the beam if they should see it.

DO Require employees to wear anti-laser eyeglasses if there is no alternative to exposure. Generally, anti-laser glasses are worn only with very powerful lasers not the low-powered construction type. Most susceptible to laser-beam damage is the eye. When necessary, use laser goggles that are marked as suitable for the particular wavelength and power density. A word of caution - Goggles may severely restrict or hinder the worker's vision in some way that jeopardizes his safety from other hazards of the job.

DO Require personnel assigned to lasers to receive a complete eye examination prior to such assignment. Subsequent eye examinations should be given each year. Any persisting after-images of a light source should be reported to a physician. Eye examinations should help in protecting a company against unjust compensation claims.

DO Keep the output down as low as possible to suit the construction work.



DO Above all, DO follow the manufacturer's instructions on the use of lasers.

### DON'T

DON'T Stare directly into the laser beam. If operators, whose work requires observation of the beam, must work close to the equipment, the intensity of the light should be reduced by attenuator caps supplied by the manufacturer or anti-laser goggles.

DON'T Allow reflective material around the area of the beam (Good Housekeeping). If the reflecting surface is flat, the characteristics of the reflected beam may be considered identical to those of the direct beam.

DON'T Attempt to locate the laser beam with the eye. This is especially important where the beam is traveling long distances. Use some type of reflective material to intercept the beam and thereby locate its position. Aiming the laser with the eye should be avoided to prevent looking along the axis of the beam, which increases the hazard from reflections.

DON'T Operate the laser in rain, snow, fog or dust, unless safety eyewear is utilized.

DON'T Use Radio Frequency excited lasers near blasting caps.  
Leave the laser equipment unattended while in the energized state.

Charles R. Nelson  
Warren Brothers Company

A booklet entitled "Guide for Uniform Industrial Hygiene Codes or Regulations for Laser Installations" is available from the American Conference of Governmental Industrial Hygienists, 1014 Broadway, Cincinnati, Ohio 45202.

\* \* \* \* \*

# CAVE-INS: A MAJOR THREAT TO LIFE IN TRENCHING OPERATIONS

The following table, published by the California Division of Industrial Safety, shows that cave-ins represent the greatest single threat to life in sewer, pipeline, and trenching activities. In second place are the hazards inherent in using or working near moving vehicles, especially trucks and heavy earthmoving equipment:

## Work Deaths in Sewer, Pipeline, and Trench Construction California, 1964-68

<u>Accident type</u>	<u>Number of work fatalities</u>
Total work deaths	76
Trench cave-ins	32
Operation of pipelaying, trenching, or earthmoving equipment	18
Crane	8
Front-end loader	5
Backhoe	4
Tractor	1
Crushed by rolling pipe	3
Operation of truck or automobile on highway or at jobsite	8
Overcome by sewer gas	5
Other	10

## Ratio of nonfatal lost-time injuries to fatalities, California, 1964-68

All contract construction	174 to 1
Sewer, pipeline, trenching contractors	50 to 1

## Trench cave-ins

Cave-ins were responsible for 32 of the 76 fatal injuries reported in sewer, pipeline, and trench construction during the past five years. Most cave-ins claimed only a single life but in a few cases more than one worker was buried beneath the collapsing earth.

There is no clear trend apparent in the number of cave-in deaths during the period studied. Over the five-year span, cave-ins claimed an average of 6 lives a year in sewer and pipeline construction but the number of deaths ranged from a low of 2 in 1966 to a high of 13 in 1967.

The lesson to be learned from these deaths is clearly evident. Most of the 32 workers who died from cave-ins had been afforded no protection against the hazards of moving earth, which might have been provided by proper shoring, by sloping, or by working in a shield.

Six of the workers killed in cave-ins in trench construction were attempting to install or remove shoring when they were killed. They might not have died or been injured if upper trench jacks had been installed first from the outside of the trench; or, in removing shoring, if the trench had been backfilled to the level of each shore before taking it out; or if the worker had been protected by a metal shield or welder's hut attached to the boom end of a trenching machine.

The two accidents described below are illustrative of cave-ins that occurred in attempting to install or remove shoring:

A laborer was helping to install shoring in a trench about 9-1/2 feet deep, when the material caved in under the existing shoring, covering his feet and lower legs. Before he could be rescued, the whole side of the trench caved in, covering him completely. The accident was caused by the unstable bank material falling in below the bottom of the shoring system that extended to about 2-1/2 feet from the bottom of the trench. When this happened, the pressure on the hydraulic-type shores was released, causing them to collapse. Solid sheeting should have been provided behind the uprights, extending to the bottom of the trench or the trench should have been sloped to meet the angle of repose.

A pipeline trench, 600 feet long and 15 feet deep, was dug in sandy soil. About 550 feet of pipe had already been laid, the shoring removed, and trench backfilled. A worker was assigned to compact the backfill in the remaining 50 feet and to remove the shoring. He had backfilled the section to an eight-foot depth. He then removed a lower jack and threw it from

the trench. When he tried to remove the upper shore, there was so much earth pressure on it he required help to force it free. When the shoring jack released, the earth wall collapsed, burying the employee in the trench. The jacks could have been released safely if the trench had first been backfilled to the height of each shore.

The three excavations dug in asphalt or concrete roadways that collapsed in the past five years fatally crushing workers testify to the particular hazards involved in excavation beneath such materials. A contractor or his job foreman may sometimes be deceived by the apparent stability of the soil and may neglect to consider that trenches located near highways and streets are more likely to collapse than similar excavations in locations not exposed to vibration and load from highway traffic. As a precaution, horizontal and vertical bracing is required where pavement is undercut and soil sloughs off beneath pavement. This procedure is especially important where blacktop is present. Removal of all undercut pavement is recommended.

The following accident is one example of the hazards associated with trenching near streets or highways.

A 6-1/2-foot deep trench was dug in a paved street. It was not shored. Underneath the surrounding asphaltic concrete pavement lay wet and unstable mud with an overlay of native red soil fill and compacted road base. Sloughing undermined the surrounding pavement, which gave way, falling into the excavation. A worker who was kneeling in the trench, welding a pipe, was crushed to death.

Moisture in the soil, whether its presence is due to failure to determine the location of working water lines or other causes, may lead to trench cave-ins. Two job-connected fatalities involving excavations near water lines are described below.

A lateral trench was dug at right angles to a main trench that was eight feet deep. Digging in the lateral trench undermined supports for a six-inch water main, causing the pipe to sag and then break. The trench quickly filled with earth and water. Fellow workers could not pull a laborer, who had been installing shoring in the lateral trench, loose from the mud which came up to his knees. He was drowned as water filled the trench. It had been assumed that the water line was no closer to the trench than five feet because of the location of a fire hydrant above ground at that distance.

A trench 12-feet deep was dug under the widened corner of a leaking water reservoir. The trench was unshored and unsloped. The ground had been dampened from the leak. Ten



tons of earth fell from the wet trench wall burying a worker who was attempting to repair the leak.

When trenching takes place in unstable soil, e. g. highly water-saturated soil, and the trench is more than 10-feet deep, the California Division of Industrial Safety requires that solid sheeting be used. The death described below clearly illustrates the reason for such a requirement.

A trench 12-feet deep was dug in soil saturated from a leaking 24-inch sewer line. A pipelayer was installing protective shoring from the bottom of the trench, working directly behind the trenching machine. A five-by-five foot wall of wet earth slid into the trench crushing and burying the pipelayer.

Occasionally employers fail to realize the extent to which digging lateral trenches increases the hazard of shifting earth. Safety men point out that when trenches are dug near each other the walls are weaker. Ground that has been filled or disturbed requires additional sheeting and bracing; so does hard compact ground if filled ground is nearby. A trench wall that is near another recently filled trench is unstable, even though it appears to be composed of hard, compact materials.

Some of the fatal cave-ins in the past five years occurred in a lateral trench rather than in the main trench. One such mishap is described below.

A lateral trench was dug at right angles to a 16-foot deep main trench. The main trench was unshored. Two laborers worked in the right angle stress point, barring down the sides of the shaft. The corner gave way, falling on the two men and crushing them to death. Barring down the side of the excavation from within undermines weak points and increases the hazard of a cave-in.

In some cases the contractor may not be aware that the area through which his trench will extend is near a recently filled trench.

In one accident, a trench 13 feet deep was thought to be stable because it had sides of rock. While digging, an old trench of backfill was encountered. A laborer who entered the trench to see how close the backhoe was digging to a sewer main was knocked down and buried when the backfill from the old trench caved in. Although his head remained above the piled earth, the worker died of suffocation and multiple internal injuries before he could be freed.

Other factors that create a hazard of cave-ins are dangerous soil conditions that are not known when the excavating commences, e. g. , soil strata dipping in various directions or hidden seams of clay. Also some rocks, like the greenish serpentines found in California, undergo a softening change when exposed to air and moisture. This is called air-slacking. Walls of such rocks are hard and solid at the time of excavation, but soften into a slippery, dangerous mass soon after exposure to air. To prevent air-slacking, some contractors apply a protective coating of gunite to such walls, in addition to shoring and bracing. Others provide extra sheeting to hold the weakened walls in place.

A hidden seam of clay in a 45-degree angle to one side of a trench opened suddenly before shoring could be put in place. A laborer who was shoveling tailings from a trencher was killed when the bank slid into the excavation and on top of him.

Strata dipped in various directions in the walls of a trench dug through a hill of soft shale and dirt. A 30-foot section of trench wall caved, dropping 10 yards of dirt onto a loader operator. The worker had gotten out of his loader and was standing between the machine and the bank.

A trench 12 to 16 feet deep was dug in a "solid wall of shale." Because the trench walls were "solid rock," no supports were installed in the trench sides. Hidden under the surface of the solid wall was a rock fault. Suddenly that wall of the trench slid over, closing the trench. One worker was killed and another injured by falling rock.

During the five-year period, two employees were killed in cave-ins while working in trenches no deeper than shoulder height.

A trench, varying in depth, was dug in ground "so hard they had to use a pick and bar before they could use a shovel." A lateral trench was dug in "hard clay and earth." Neither trench was shored or sloped. At a point where the trench was four feet deep, a section of wall 10 feet long gave way, burying a laborer to the lower part of his chest. Pressure of the earth against his lower ribs kept him from breathing and he suffocated.

A trench, just over four-feet deep, was dug in what appeared to be solid hardpan clay. The excavation was not shored. A six-foot section of the trench wall fell, crushing the chest of a laborer setting pipe in the excavation.

\* \* \* \* \*

## RECLAMATION STUDYING EFFECTS OF HERBICIDES IN IRRIGATION SYSTEMS

A three-year monitoring and water analysis program has been begun by the Bureau of Reclamation on the Columbia Basin Project in Washington State to determine the effects of using herbicides in irrigation systems, the Department of the Interior reported today.

Commissioner of Reclamation Floyd E. Dominy said the program is part of a nation-wide study in which the Bureau is participating. Mr. Dominy said that data obtained from the study will be used to support national registration of commonly used herbicides.

Under the Department of Agriculture's compulsory registration program for herbicides used in or near irrigation systems, evidence must be submitted demonstrating that a herbicide can be used at prescribed concentrations without injury to man, wildlife, livestock, or crops before that particular herbicide can be approved. Some herbicides have now been in common use for as long as 20 years with very little documentation having been obtained as to the effect of the herbicides. The purpose of the Reclamation study is to obtain such documentation.

The Columbia Basin Project in Washington was selected for the study because of its broad system of canals, laterals, and drains of various sizes, lengths, and conditions, and the availability of personnel experienced in water monitoring procedures and needs. The program will be closely coordinated with the three irrigation districts who actually carry out the weed control operation on the Project. Samples will be taken at various points of the irrigation system during or following routine applications to canals or canal banks of the herbicides normally used on the Project. In addition to the water samples collected, some sampling of canal bottom soils may be done to determine the amount of herbicide residue present. All samples will be shipped to the Bureau of Reclamation's Research laboratories in Denver for analysis.

Throughout the sampling program, agronomists will identify and appraise both aquatic and terrestrial vegetation in the sampling areas so that the effect of herbicides at the different sites can be evaluated. Some of the things that are expected to be learned from the study are the extent of dilution of particular herbicides as they move through the irrigation system, the degree of absorption in soils or plant life which takes place, and the amount of loss through evaporation.

\* \* \* \* \*

## ORGANIZING FOR LOSS CONTROL

### Elements of a Model Loss Control Program

--From the American Insurance Association's  
Construction Management Bulletin CM 1.10

The basic objective of any loss control program is to insure the unity of purpose and action required for the effective control of accidents. When properly organized and supported the loss control program is the key to fewer accidents, lower insurance costs and greater profits for the contractor.

Contractors differ widely in the type of work they do, the areas in which they operate and the size of the work forces they employ. The effective program recognizes these differences. However, successful contractors have proven that certain elements are common to all effective loss control programs. It is the purpose of this article to review these elements as the foundation on which the contractor can build a program tailored to his requirements.

#### EXECUTIVE SUPPORT

Executive management must be convinced of the need to control accidents and they must be willing to give the program the visible support required for good results. They must also be willing to include a realistic sum of money for safety in all estimates. When these decisions have been made, a concise statement of "Safety Policy" should be released over the signature of the President. This should be disseminated throughout the organization with the objective of creating and maintaining interest and action at all levels of supervision.

#### COORDINATION

A management representative should be assigned the responsibility for coordinating the loss control activities. This may be a full-time or part-time position, depending on the size of the organization. Whenever possible, this individual should be an experienced safety engineer who is familiar with construction methods and equipment. He should report directly to a corporate executive. His duties should include assisting field supervision in establishing and maintaining their safety activities. He should also report periodically to executive management, keeping them advised of safety progress, plans for the future and problems requiring management action.

Using the "Safety Policy" as a foundation, the coordinator should develop and release the broad loss control guidelines to be followed on all jobs. These should include, but not be limited to, the following:

#### RESPONSIBILITY

Management must be held responsible and accountable for loss control on all jobs under their supervision, including work done by all sub-contractors.



## PLANNING

Effective pre-job planning for safety makes it possible to detect and eliminate or control many situations which can produce serious accidents. Planning for safety is also essential as the job progresses or when change orders introduce new operations or exposures.

## SAFETY EDUCATION

As far as is practical, men who are hired should be experienced and physically and emotionally qualified for the work they will do. Their indoctrination should include an explanation of the safety program and what is expected of them. As the work progresses "tool-box" meetings, personal contacts, safety posters and various training materials should be used to stimulate employee interest and support.

## JOB INSPECTION

Regular inspections should be made of the entire job to uncover unsafe conditions and unsafe acts before they cause an accident. A brief report should be made on the findings and there should be prompt follow-through on all recommendations.

## FIRST-AID AND MEDICAL

There should be adequate medical facilities and first aid personnel on all jobs. These may range from a trained first-aider and a first-aid kit on the smaller jobs to a full-time nurse and doctor with complete facilities on large jobs.

## FIRE PREVENTION AND CONTROL

Fire is a potential hazard on all types of work. There should be a definite plan to prevent, detect and control fires. Such a plan should be tailored to the needs of the jobs.

## FLEET SAFETY

Most construction jobs require the use of trucks and other automotive equipment. Fleet safety should be a part of the overall program. This portion of the program may be very brief or detailed, depending on the size of the fleet and the work being done.

## ACCIDENT INVESTIGATION

The foremen should investigate each accident involving their men. The purpose should be to determine the basic cause and the corrective action required to prevent recurrence. Written reports should be submitted to the job superintendent indicating the action taken or required.

The information contained in this publication was obtained from sources believed to be reliable. The American Insurance Association, its companies and employees make no guarantee or results and assume no liability in connection with either the information herein contained, or the safety suggestions herein made. Moreover, it cannot be assumed that every acceptable safety procedure is contained herein; or that abnormal or unusual circumstances may not warrant or require further or additional procedure.

\* \* \* \* \*

# OFF-THE-JOB SAFETY

## TV RADIATION

Why do TV sets put out X-rays? It's part of their operation and, under present technology, impossible to avoid completely. Color sets--because of their higher operating voltage--are more likely to produce X-rays than black-and-white models, and then only under certain circumstances.

The potential for X-ray generating exists at three points in the TV set: at the high-voltage rectifier, the high-voltage shunt regulator, and at the picture tube. Generation of X-rays occurs when high-speed electrons are slowed down because of striking a dense material, such as metal. When this happens, some of the energy of the electrons is converted to electromagnetic radiation. Generally speaking, X-rays can be developed this way only by electron beams that have been accelerated at electrical pressures in excess of 15,000 volts.

The X-rays produced by color TV sets, if any, have been accelerated by an electromotive force in the 25,000-volt range. Such X-rays are classified by electronics engineers as "soft" (low penetrating power) in comparison with the "hard" X-rays used for testing and diagnostic purposes. But there's another, more important, difference: the accumulated dose is a result of time as well as of intensity. A diagnostic X-ray at your doctor's or dentist's allows you to be irradiated for perhaps a fraction of a second. You or one of your children might, on the other hand, spend all evening close to your color set.

The average TV viewer may be exposed to no dose whatever or such an insignificant one that it would be hard to measure. Yet several investigations indicate that a TV viewer could get a significant radiation exposure. Controversy revolves around just how much is harmful and what can or should be done to prevent danger to the public.

It has been speculated by competent medical authorities that some defective TV sets are capable of generating enough X-rays to produce genetic changes without signaling any alarm to the person affected. Such genetic changes have no apparent clinical effect on the individual who receives the radiation, and perhaps no effect will be passed on to his children. But according to some theories, his grandchildren could be affected.

It goes without saying that no one will knowingly take a chance on genetic damage. And happily, in this case at least, it is easily avoided.

Television technicians who have received formal education in their trade have been warned repeatedly about the danger to themselves and to their

customers that can result from sloppy set-up and maintenance work. Every reputable TV manufacturer furnishes precise instructions for making all needed adjustments; these must be followed to the letter for maximum safety.

Every time your set is worked on, the technician must check out the set's high-voltage performance with an accurate kilovoltmeter. The voltage must be high enough to give you a good picture yet not so high as to cause the set to emit excessive X-rays. The technician must also be careful to leave the set with all protective shielding on the chassis intact.

X-rays of the "soft" type are dissipated by traveling through space. So, just to be safe, you and your childred should keep at least 6 feet away from a large-screen set.

X-radiation from TV sets, based on present knowledge, is nothing to panic about. But since there are still some unknown, or "X" elements in the technical end of the field, caution might prove to be the wisest course.

\* \* \* \* \*

### SPIDER SPREADS

The venomous Brown Recluse spider, said to be deadlier than a Black Widow, has now taken up residence in California. An 11-year-old Sacramento girl underwent extensive treatment after being bitten.

The dangerous spider, marked distinctively with a fiddle-shaped marking near its head, was found first in southern states. In recent years it has spread into northern areas and has now traveled into several western states.

\* \* \* \* \*

### KEEP YOUR CHARCOAL DRY

When storing new charcoal, be sure to keep it dry at all times. There have been instances of charcoal igniting and causing fires after being exposed to damp weather. If you douse hot coals with water in order to extinguish them for later use, spread them out to dry thoroughly in the sun and then store them in a metal container, preferably away from the house.

\* \* \* \* \*



# SAFETY PERFORMANCE RECORD

## CUMULATIVE QUARTERLY REPORT GOVERNMENT FORCES

2nd QUARTER, 1969

PERIOD FROM JANUARY 1, 1969 THROUGH June 30, 1969

REPORTING OFFICE	NUMBER OF EMPLOYEES (AVERAGE)	MAN HOURS	DISABLING INJURIES		DAYS LOST	FREQUENCY RATE	SEVERITY RATE
			CUMULATIVE THIS YEAR	FATAL *			
Washington Office	333	328,840					
Denver Office	1,368	1,399,204					
REGION 1							
Boise Regional Office	186	149,535					
Central Snake Project	39	37,754	1		47	26.5	1,245
Chief Joseph Dam	37	35,139					
Columbia Basin Project	719	733,568	1		9	1.4	12
Green Springs Powerplant	2	2,151					
Hungry Horse Project	48	39,570					
Lower Columbia Development Office	54	51,144					
Lower Teton	10	6,810					
Minidoka Project	69	72,474	1		94	13.8	1,297
Snake River Development Office	61	60,186					
Third Powerplant Construction Office	201	193,388	1		2	5.2	10
Upper Columbia Development Office	44	41,017					
Wild Horse Dam	4	7,499					
Yakima Project	33	27,108					
Totals & Averages	1,507	1,460,745	4		152	2.7	104
REGION 2							
Sacramento Regional Office	581	646,147	2		5	3.1	8
Regional Drill Crew	41	42,411	1		16	23.6	377
Auburn-Paloam South Unit	206	193,767					
Cachuma Operations Field Branch	3	2,848					
Central Coast Dev. Field Branch	4	3,472					
Paloam Field Division	74	76,652					
Presno CVP Construction Office	146	132,015	1		6	7.6	45
Presno Field Division	140	140,975					
Klamath Project Office	20	19,544					
Lahontan Basin Projects Office	66	52,160					
Napa Development Field Branch	3	3,024					
Sacramento Valley CVP Constr. Office	118	118,519					
San Luis Unit CVP Construction Off.	131	155,401					
Shasta Field Division	146	149,986					
Solano Operations Field Branch	3	3,016					
Tracy Field Division	164	167,793					
Upper North Coast Dev. Field Branch	4	4,000					
Totals & Averages	1,850	1,911,733	4		27	2.1	14
REGION 3							
Boulder City Regional Office	231	194,240					
Boulder Canyon Project	167	147,708					
Dixie Project Office	5	4,695					
Mead Construction Office	26	26,033					
Lower Colorado River Project	200	187,817	1		75	5.3	399
Parker-Davis Project	332	337,742	1		30	3.6	89
Phoenix Development Office	94	89,760					
Southern California Dev. Office	21	16,726					
Southern Nevada Water Project	80	77,193					
Transmission Lines Office	5	8,400					
Yuma Projects Office	127	127,682					
Totals & Averages	1,288	1,217,997	2		105	1.6	86
REGION 4							
Salt Lake City Regional Office	229	218,271	1		5	4.6	23
Central Utah Project	187	176,474					
Curecanti Unit	85	72,916	1		5	13.7	69
CRSP Power Operations Office	275	267,755	1		2	3.7	7
Durango	25	25,452					
Grand Junction	51	49,152					
Logan Development Office	8	8,856					
Lyman Project	30	24,941					
Upper Green River Development Office	24	21,200					
Weber Basin Project	2	17,786					
Totals & Averages	916	882,861	3		12	3.4	14
REGION 5							
Amarillo Regional Office	93	93,799					
Albuquerque Development Office	33	33,056					
Austin Development Office	45	46,932					
Canadian River Project		838					
Lower Rio Grande Project	1	1,672					
Middle Rio Grande Project	217	226,950					
NavaJo Project	74	77,711	1		5	12.9	64
Oklahoma City Development Office	20	17,533					
Pecos River Project	13	10,129					
Rio Grande Project	223	218,974					
San Juan-Chama Project	75	79,141	1		10	12.6	126
Totals & Averages	794	807,135	2		15	2.5	19
CONSOLIDATED TOTALS							
TOTALS LAST YEAR (19 )							

\*FATALITIES INCLUDED IN TOTAL DISABLING



## SAFETY PERFORMANCE RECORD

CUMULATIVE QUARTERLY REPORT  
GOVERNMENT FORCES

2nd QUARTER, 1969.

PERIOD FROM JANUARY 1, 19<sup>69</sup> THROUGH June 30, 19<sup>69</sup>

REPORTING OFFICE	NUMBER OF EMPLOYEES	MAN HOURS	DISABLING INJURIES		DAYS LOST	FREQUENCY RATE	SEVERITY RATE
		CUMULATIVE THIS YEAR	CUMULATIVE THIS YEAR	FATAL*	CUMULATIVE THIS YEAR	CUMULATIVE THIS YEAR	CUMULATIVE THIS YEAR
REGION 6							
Hillings Regional Office	160	150,880					
Geology and Drill Crews	10	6,574					
Canyon Ferry Project	20	16,993					
Fort Peck Project	41	36,268					
Missouri-Oahe Projects	242	217,600					
Missouri-Souris Projects	326	264,521					
Power System Operations Office	50	52,240					
Riverton Project	4	3,956					
Upper Missouri Projects	81	75,842	1		10	13.2	132
Yellowtail Construction Office	8	16,198					
Yellowtail Project Office	32	33,992					
Totals & Averages	974	875,064	1		10	1.1	11
REGION 7							
Denver Regional Office	193	197,360	1	1	6,000	5.1	30,401
Glen Elder Construction Office	35	44,832					
Kansas River Projects	103	97,648					
Dryden-Arkansas Project	175	178,984					
Niobrara-Lower Platte Dev. Office	31	29,563					
North Platte River Projects	229	239,440	2	1	6,120	8.3	25,559
South Platte River Projects	165	160,472					
Totals & Averages	931	948,304	3	2	12,120	3.2	12,781
			</				

\*FATALITIES INCLUDED IN TOTAL DISABLING

# SAFETY PERFORMANCE RECORD

## CUMULATIVE QUARTERLY REPORT CONTRACTOR FORCES

2nd QUARTER, 1969

PERIOD FROM JANUARY 1, 1969 THROUGH June 30, 1969

REPORTING OFFICE	NUMBER OF EMPLOYEES (AVERAGE)	MAN HOURS	DISABLING INJURIES		DAYS LOST	FREQUENCY RATE	SEVERITY RATE
		CUMULATIVE THIS YEAR	CUMULATIVE THIS YEAR	FATAL *	CUMULATIVE THIS YEAR	CUMULATIVE THIS YEAR	CUMULATIVE THIS YEAR
REGION 1							
Chief Joseph Dam	17	27,726	2		23	72.1	829
Columbia Basin Project	197	124,287	2	1	6,004	16.1	48,307
Green Springs Powerplant		256					
Hungry Horse Project		99					
Lower Teton	4	3,030					
Minidoka Project		3,057					
Third Powerplant Construction Off	464	599,292	5		322	8.3	537
Wild Horse Dam	9	8,567					
Yakima	3	1,926					
Totals & Averages	694	768,240	9	1	6,349	11.7	8,264
REGION 2							
Auburn-Folsom South Unit	161	82,251					
Fresno CVP Construction Office	223	157,905	1		7	6.3	44
Fresno Field Division		8,669					
Lahontan Basin Projects Office	122	33,436					
Sacramento Valley CVP Constr. Off.	82	45,689					
San Luis Unit CVP Constr. Office	256	136,803					
Tracy Field Division		1,390					
Totals & Averages	844	466,143	1		7	2.1	15
REGION 3							
Boulder Canyon Project	12	4,138					
Lower Colorado River Project	34	20,604					
Mead Construction Office	9	23,305	3		40	128.7	1,716
Parker-Davis Project	31	23,734					
Southern Nevada Water Project	262	223,501	4		258	17.9	1,154
Yuma Projects Office	13	15,996					
Totals & Averages	361	311,278	7		298	22.5	957
REGION 4							
Central Utah Projects	280	196,194	5	1	6,216	25.5	31,683
CRSP Power Operations Office	4	3,597					
Curecanti Unit	149	79,182	3		134	37.9	1,692
Durango		3,073					
Lyman	112	30,045					
Upper Green River	17	4,067					
Weber Basin Project	21	8,749					
Totals & Averages	583	324,907	8	1	6,350	24.6	19,544
REGION 5							
Amarillo Regional Office		1,162					
Canadian River Project		7,621					
Navajo Project	43	29,734					
Pecos River Project	22	19,476					
San Juan-Chama Project	502	529,340	4		90	7.5	179
Totals & Averages	567	587,333	4		90	6.8	153
REGION 6							
Missouri-Cahe Projects	308	156,576	2		8	12.8	51
Missouri-Souris Projects	87	27,628					
Riverton Project	9	4,003					
Upper Missouri Projects	6	44,113					
Yellowtail Construction Office		30,478	1		15	32.8	492
Totals & Averages	410	262,798	3		23	11.4	88
REGION 7							
Fryingpan-Arkansas Project	82	113,511	5		72	44.1	635
Glen Elder Construction Office	59	40,934	1		26	24.4	635
Kansas River Projects	30	16,837					
North Platte River Projects	31	17,304					
South Platte River Projects		2,738					
Totals & Averages	202	191,227	6		98	31.4	512

\*FATALITIES INCLUDED IN TOTAL DISABLING







# "WHERE ARE YOUR SAFETY GOGGLES?"



PunnettHAM '68  
Region 7

THE CONSTRUCTION SAFETY STANDARDS  
HELP PREVENT ACCIDENTS, FOLLOW  
THEM !



# RECLAMATION SAFETY NEWS



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Front Cover Photo: Robert W. Cary, Regional Safety Officer, Sacramento, California, is shown presenting the American Red Cross Certificate of Merit for Outstanding Service to Mike Linville, who saved the life of Shelly Simonson, 13, after she was struck by lightning at a swimming pool in Klamath Falls, Oregon. (See article on pages 3-8.) Photo PX-D-65134.

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# BUREAU SAFETY PERFORMANCE

## 1969 CUMULATIVE ACCIDENT RECORD

January 1 - September 30, 1969

### A. GOVERNMENT FORCES

<u>Region</u>	<u>Injury index*</u>	<u>Frequency rate</u>	<u>Severity rate</u>	<u>Vehicle accident rate</u>
Region 6	0.1	0.8	8	2.3
Region 5	0.2	1.7	13	3.7
Region 2	0.3	1.7	16	2.0
Region 4	1.0	3.7	27	1.6
Region 3	2.6	1.6	162	1.8
Region 1	2.8	2.8	100	4.2
Region 7	<u>177.8</u>	<u>2.1</u>	<u>8,465</u>	<u>1.9</u>
Totals to Date	14.7	1.7	863	2.5
Totals 1968	0.4	1.1	33	2.6

\*Injury index is equal to frequency rate times severity rate divided by 100.

### B. CONTRACTOR FORCES

<u>Region</u>	<u>Injury index</u>	<u>Frequency rate</u>	<u>Severity rate</u>	<u>Fatal injuries</u>
Region 2	2.0	4.7	43	0
Region 6	9.5	9.7	98	0
Region 5	37.7	8.5	444	0
Region 3	134.5	18.2	739	0
Region 7	160.7	31.5	510	0
Region 1	735.3	11.1	6,624	1
Region 4	<u>1,681.2</u>	<u>17.6</u>	<u>9,552</u>	<u>1</u>
Totals to Date	361.5	12.3	2,939	2
Totals 1968	621.0	12.2	5,090	6

### C. RECLAMATION CIVILIAN CONSERVATION CENTERS

Frequency rate: 2.0  
Severity rate: 19  
Vehicle accident rate: 23.4



## LOST TIME ACCIDENT ANALYSIS

Government Forces - 1969  
Third Quarter

Cumulative to Date:  
September 30, 1969

### A. ACCIDENT CLASSIFICATION

<u>Description</u>	<u>No.</u>	<u>Days lost</u>
Aircraft (helicopter)	2	12, 000
Cave-in	1	6
Vehicle	4	156
Flash burn	1	2
Handling materials and equipment	5	268
Falls of persons	8	255
Falling objects	1	10
Handtools	2	18
Machinery	1	28
Total	25	12, 743

### B. OPERATIONAL SUMMARY

<u>Operation</u>	<u>Man-hours</u>	<u>No. of accidents</u>	<u>Days lost</u>	<u>Frequency rate</u>	<u>Severity rate</u>
Administration, Clerical and Design	6, 279, 895	2	6, 030	0. 3	960
Construction	2, 226, 537	7	172	3. 1	77
Investigation	1, 651, 343	5	168	3. 0	102
Power O&M	2, 996, 361	10	6, 326	3. 3	2, 111
Irrigation O&M	1, 616, 916	1	47	0. 6	29
Totals	14, 771, 052	25	12, 743	1. 7	863

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## NATIONAL SAFETY COUNCIL DATA SHEETS

The National Safety Council has recently published new or revised technical data sheets on the subjects listed below. Copies of these data sheets (by the numbers shown in parentheses) may be obtained from the National Safety Council, 425 N. Michigan Avenue, Chicago, Illinois 60611:

Respiratory Protective Equipment (444 Revision A)  
Iodine (457 Revision A)  
Portable Reamer-Drills (497 Revision A)  
Work Accident Records and Analysis (527 Revision A)  
Off-the-Job Safety (601)  
Posters, Bulletin Boards, and Safety Displays (616).

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## DOING YOUR THING

--By Robert W. Cary,  
Regional Safety Officer  
Region 2, Bureau of Reclamation  
Sacramento, California

"Everyone out of the pool, " shouted Mike Linville. (See cover.)

It was late afternoon on a hot July day. There aren't many days warm enough for swimming in Oregon, even in July, so Mike wasn't surprised at the groan that came from the youngsters crowding the Klamath Falls municipal swimming pool.

"Do we have to, Mike?" asked a pert bonde teenager.

"You bet your life you do, " the pool manager replied. "You know the rules about swimming during a thunderstorm."

A distant flash of lightning, followed a minute later by a rumble of thunder helped Mike convince the older youngsters he meant business.

"Everybody out, now, " Mike shouted again. "Get your clothes and get away from the pool before that storm hits us."

Still grumbling, the teenagers pulled themselves over the edge of the pool, capped up their lotions and creams and began pulling their younger brothers and sisters from the water.

"That storm is moving in fast, Mike, " said Jim Beene. Like Mike, Jim had graduated from a Red Cross water safety instructor's course and knew what could happen if lightning struck a crowded pool.

"It sure is, " Mike agreed. "Let's get these kids out of here--fast."

After a few minutes of cajoling, kidding--and some threats of physical violence--the two young men relaxed as the last of the stragglers walked out of the gate, laughing and clowning away from the pool.

The first raindrops began to fall as Mike and Jim prepared to close up.

"That's about it, Marie, " Mike said to Mrs. Marie Siljan. "If you've got your money counted, you might as well . . . ."

A blinding flash almost immediately accompanied by a blast of thunder ended Mike's conversation with the cashier. Then the incredible stillness was shattered once again--this time by screams of terror and the cry: "It's Shelly. She's been hit!"

Looking up Mike saw Shelly Simonson, 13, lying flat on the ground, just 25 feet from the pool.

He rushed to her side. He could see that she had been burned severely. She didn't appear to be breathing. He felt for her pulse. It was very weak.

Momentarily, Mike felt panic welling within him. What could he do? What should he do? But only momentarily.

It was almost as though his entire life had prepared him for this moment.

Although he was only 21 years old when Shelly Simonson was struck down by lightning on July 9, 1969, Mike had already had 16 years of training in water safety and lifesaving courses.

He had taken his first course in swimming when he was five years old, a course sponsored by the Klamath Basin Chapter of the American Red Cross. At the age of 12, he had earned his junior lifesaving certificate, the youngest age at which the certificate can be awarded; at the age of 16, his senior certificate, again at the youngest age possible; and two years later his water safety instructor certificate.

It hadn't been too long since he had last practiced mouth-to-mouth resuscitation on the Klamath Basin Red Cross Chapter's Resusci-Anne to help maintain his proficiency.

Looking down on Shelly Simonson's cold, pale face, Mike was reminded of Resusci-Anne--and he knew what to do.

Quickly he straightened out her body and, with his hand, lifted her neck, letting her head tilt back. Then, covering her mouth with his mouth, he blew--hard--for a couple of seconds, watching her chest rise slowly. He lifted his mouth and watched her chest fall and felt the air from her mouth on his face. He took a deep breath and blew more air into Shelly's lungs, then waited for it to come out.

Over and over again, he repeated the process--every five or six seconds--for what seemed like hours--but was actually only minutes--until a doctor and an ambulance arrived.

Their arrival in time was due to the training and discipline of Mike's co-workers at the pool. While Mike was giving Shelly mouth-to-mouth resuscitation, Jim Beene was calling a doctor and Mrs. Siljan was summoning an ambulance, all according to previously adopted emergency procedures.

There is no doubt that Shelly Simonson owes her life to the quick action of Mike Linville, Jim Beene and Marie Siljan. But like many, many other residents of Klamath Falls, she also owes a deep debt of gratitude to the Klamath Basin Chapter of the American Red Cross.

Under the direction of Mrs. John P. Tribe, its volunteer water safety chairman, the Klamath Basin Chapter offers water safety training to over 4,000 Klamath Falls residents every year.

Mike Linville actually began his swimming career a little late by Klamath Falls standards--he was already five years old when he took his first lessons.

Ruth Tribe likes to get her hands on potential swimmers when they're about three years old. The Chapter offers a "water baby" course for children who can't touch the bottom of the pool and keep their heads out of the water at the same time.

The objective of this first course--which requires active participation by the parent--is to get the children to feel at home in the water, to have fun--but to learn a proper respect for water. Above all, terrifying "sink or swim" experiences are avoided.

The training emphasizes attention to little things, such as making sure the child enters the pool for the first time facing one of his parents--not a wide expanse of unfriendly water. The Red Cross film, "Teaching Johnnie to Swim," is shown to both the parents and the children.

As Klamath Falls children grow up, the Chapter's water safety program meets their continuing needs and aspirations, from beginner to advanced swimmer. Various water skills are taught, including how to aid a drowning person from the shore, how to put on a lifejacket correctly, how to give artificial respiration. Classes are offered in junior and senior lifesaving, and for water safety instructors.

In addition to setting up all of these courses--and others--Ruth Tribe is an active participant in the training program.

She has been active in the program since 1945--before Mike Linville was born. She has been water safety chairman for the Chapter--and a water safety instructor trainer--since 1963.





Instructor-Trainers Ella Redkey and Ruth Tribe demonstrate Resuscitate with Merland Phelps, first-aid volunteer. Photo PX-D-65137.



Mrs. Tribe, center, is assisted by Mrs. Terrence Boyer (left) and Mrs. James Shepherd (right) in selecting the winning entries in the annual Water Safety Poster Contest. Photo PX-D-65136.

Since 1957, she has had an instructor's card for teaching the handicapped to swim, and the Chapter's classes for the handicapped have grown from one polio patient 10 years ago to more than 30 suffering handicaps of all types in 1969.

Separate classes are also held for mentally retarded children.

The Chapter uses a Resusci-Anne manikin to teach the proper method of mouth-to-mouth resuscitation. By the end of 1968, 4,603 people had practiced rescue breathing on the Chapter's Resusci-Anne.

Luckily for Shelly Simonson, Mike Linville was one of them.

During the spring of 1969, a Resusci-Baby was borrowed from the Regional Office of the Bureau of Reclamation in Sacramento for a six-week training period.

The Klamath Basin Chapter offers scholarships to the National Red Cross Aquatic Schools every year and fosters interest in swimming and water safety through a water safety poster contest in all of the schools in Klamath County. This contest begins at the first grade level and continues on up through junior high school. The posters are judged by art teachers and water safety experts and are placed on display in store windows throughout the county.

The Klamath Falls Recreation Department and the Bureau of Reclamation cooperate with the Red Cross each year in their Water Safety Program. The overall effectiveness of the program can best be attested to by the fact that in spite of hundreds of square miles of natural lakes, reservoirs, rivers and canals in the Klamath Falls area, only three deaths from drowning have occurred in this area during the past five years--an outstanding record.

The swimming season in Klamath Falls lasts only 10 or 12 weeks. Most of it is devoted to plain hard work by Mrs. Tribe, her fellow instructors, and the pupils. But the end of the season is celebrated with a fun fest, the annual Water Safety Festival, which draws more than 700 fans to the municipal pool.

This year the theme of the festival was "Doing Your Thing." Most of the program was on the light side--music, clowns, bathing beauties, and water ballets. But there were serious moments. After a demonstration of mouth-to-mouth resuscitation, Mrs. Tribe went to the microphone and said: "Few of us have ever had the privilege of being able to help save a fellow being's life. Many of us wonder, even if trained, would we be able, if an incident really occurred, to apply our training effectively?"

Then she called upon me, as a representative of the Bureau of Reclamation, to present the American Red Cross Certificate of Merit for Outstanding Service to Mike Linville, who had successfully met the test so few are called upon to take. Presenting the certificate to Mike was one of the most satisfying moments in my 25-year career as a safety engineer.



Training for the Handicapped is an important feature of the Red Cross Water Safety program in the Klamath Basin Chapter. Red Cross volunteers serve with the YMCA during the winter swim program, and with the City Recreation Department in Klamath Falls during the summer swim months. The program has been extended to the swimming pool at Malin, Oregon during 1969. In this picture Carolyn Ough, Red Cross Water Safety Aide and Mrs. Tribe, Water Safety Instructor, volunteer time assisting Debra Miller and Lynn Senecal to learn the flutter kick, designed to rebuild leg muscles damaged by disease or injury. Photo PX-D-65135.

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FROM THE DESK OF THE ASSISTANT  
TO THE REGIONAL DIRECTOR - REGION 6

--By William Lange, Jr.

At one time or another all of us on safety committees or associated with the safety effort or just interested in the subject must wonder whether or not our efforts have been productive. Stop wondering. They have, and then some! Compare, for example, the experience of the Riverton Project in 1923 with the record of the Missouri-Oahe Projects Office in 1968. Staffing levels were reasonably comparable but that is where the comparison ends. In 1968, Missouri-Oahe Projects Office completed the year with no deaths, no lost time injuries of any kind, no motor vehicle accidents - practically no blemish on their record. Compare this with 1923 on the Riverton Project. Quoted from the Project History of that year: "There have been no very serious injuries to employees on the work, but there have been quite a number of minor injuries. There have been no deaths at our camps from disease, and only one injury resulted in death." This is followed by two pages listing injuries - 47 of them. Using our modern day method of statistical computations, this translates to a frequency rate of 112.3 and a severity rate of 16,186.

Who said, give me the good old days!

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STANDARD FOR CRAWLER, LOCOMOTIVE AND  
TRUCK CRANES NOW AVAILABLE

A new USA Standard Safety Code for Cranes, Derricks, Hoists, Jacks and Slings--Crawler, Locomotive and Truck Cranes (USAS B30.5-1968), has been published by the American Society of Mechanical Engineers, United Engineering Center, 345 East 47th Street, New York, New York 10017. This standard is available at \$2.50 per copy from the American National Standards Institute, Inc. (formerly the United States of America Standards Institute, Inc.), 1430 Broadway, New York, New York 10018.

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Two women who were maneuvering their car into a tight parking space gave up after a valiant struggle when the driver shut off the motor and said to her companion: "This is close enough. We can walk to the curb from here."



# SAFETY AWARDS

## DEPARTMENT OF THE INTERIOR CERTIFICATE OF SAFETY ACHIEVEMENT

Employees of the Navajo Indian Irrigation Project in New Mexico earned awards for attaining over 500,000 man-hours without a disabling injury and for attaining over 500,000 vehicle miles without an accident. Shown below at the presentation are, left to right: A. V. Ruple, Regional Safety Officer; Bert Levine, Project Construction Engineer; D. E. Golightly, Project Safety Officer, and H. S. Latham, Chief Safety Engineer. Photo P809-529-2454NA.



Employees of the South Platte River Projects, Loveland, Colorado, earned the Department of the Interior Certificate of Safety Achievement for the completion of 1, 014, 315 man-hours of exposure without a disabling injury. Shown below at the award presentation are, left to right: James Ingles, Regional Director, James Stokes, Project Manager, and James Kezer, Chairman of the Safety Committee of the South Platte River Projects. Photo PX-D-65140.



#### REGIONS 2 AND 7 WIN FIRST PLACE IN NATIONAL FLEET SAFETY CONTEST

Region 2, Sacramento, California, won First Place in the 1968-1969 National Fleet Safety Contest, sponsored by the National Safety Council, for the Government Fleet Division, City Truck Group 1.

Region 7, Denver, Colorado, won First Place in the 1968-1969 National Fleet Safety Contest - Passenger Car Division, Western Region Groups, Group 1.

## SAFETY CITATION PRESENTATIONS

Guernsey Powerplant, North Platte River Projects, Wyoming: Mr. James M. Ingles, Regional Director, is shown below, left, presenting the Region 7 Safety Citation for 4,000 days without a disabling injury to Mr. Fritz F. Schulz, Guernsey Powerplant Foreman. Photo P20-703-6041NA.



Glendo Powerplant, Glendo Unit, Wyoming--Missouri River Basin Project: The employees are shown, above right, after receiving an award for 4,000 days without a disabling injury. Left to right seated: Richard D. Wyant, Operator; John D. Morgan, Operator; Frank E. Carpenter, Glendo Powerplant Foreman; Nathan Replogle, General Superintendent; Charles H. Saunders, Project Safety Officer; Stanley S. Stolt, Chief of Power Operations; Duane A. Fertig, Clerk (back); Fritz F. Schulz, Guernsey Powerplant Foreman (front); standing: Robert C. Young, Operator; Roger G. Hellwege, Operator; Marvin H. Martens, Operator; Virgil L. Brown, Operator; Harold A. Malkuch, Mechanic; Dan Winans, Regional Safety Engineer, Ab Watts, Regional O&M Branch; Robert Daly, Maintenance man; Harry O. Caperton, Regional Supervisor of Power; Don Hull, Electrician; Jim D. Harris, Electrician; Ralph D. Asbridge, Chief of Power Division; James M. Ingles, Regional Director, and Robert M. Sensintaffar, Project Manager. Photo P449-703-3656NA.

## SAFE DRIVER AWARDS

Auburn-Folsom South Unit, Auburn, California: Fred J. Lasko, Project Safety Engineer, is shown below giving National Safety Council Safe Driver Awards to C. Kelley, E. Baird, M. Archibald, and J. Lewis. Photo P859-245-3215NA.



## CONSTRUCTION SAFETY AWARD PRESENTED TO BUSHMAN CONSTRUCTION COMPANY



Mr. Leo Bonneau (left), vice-president of Bushman Construction Company, accepts the Bureau of Reclamation's Construction Safety Award from Mr. Harvey A. Brashears, Chief, Engineering Division, Kansas River Projects, McCook, Nebraska. The Bushman Construction Company completed work on the Milburn Diversion Dam Dike Project without a single lost time accident. Photo P499-701-5.

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## FROM THE FIELD

CRSP Power Operations Office--Safety Movie: A movie, "Watch the Wires," was shown at the general safety meeting. This film was produced by the Detroit-Edison Company and vividly demonstrates the hazards of construction work near high tension lines.

Auburn-Folsom South Unit, California--First-Aid Training: Pictured below are Auburn-Folsom South Unit employees who attended a Bureau of Mines First-Aid Training Class August 27-29, 1969. From left to right standing: Lou Wertenberger, George Ettles (Instructor), Loyd Ericson, Bob Donelson, John Santa, Jim Damgaard, Fred Lasko, Leon Crenshaw (Examiner, Regional Safety Office). Sitting: Roscoe Bell (Assistant Instructor), Tom Kirn, Dave Dunahay, Gary Dobson, and Maynard Meeham. Photo PX-D-65139.



Columbia Basin Project, Ephrata, Washington--On-site Construction Safety Meetings Begun: The first of a new series of safety meetings for contractor and Bureau of Reclamation personnel was held at a construction jobsite near George, Washington, October 1, 1969. Attending the meeting were Delbert Mike and Jackie Johnson, nine of their M & J Construction Company employees, and nine Bureau of Reclamation Construction Branch personnel.

According to Dennis Fankhouser, Columbia Basin Project Safety Engineer, the first program was centered around a film entitled "Knowing is Not Enough," which emphasizes the need to actually use good safety practices and procedures; just knowing them does not prevent accidents. A new program with a different safety theme will be presented for the crew and inspectors at each construction site on the project once a month. The Bureau is being assisted in this program by A. H. Hobart, Safety Engineer with the Washington State Department of Labor and Industries.

Mr. Fankhouser says that using a trailer which can be moved to the construction site makes it possible to reach more workmen than can attend if meetings are held elsewhere. The trailer is equipped with a small portable generator, a projection screen and projector, and is large enough for meetings of 25 people.

Pictured below (left to right) are: Jackie Johnson; A. H. Hobart, Dennis Fankhouser, Delbert Mike, Harold Wilcox and Jack Woods. Photo PX-D-65138.



## WHY BLANCO WAS A SAFE TUNNEL

By A. D. Campbell

Chief, Administrative Services  
San Juan-Chama Project Office  
Santa Fe, New Mexico

The accident frequency rate on the Blanco Tunnel was only 5.9, compared to a national average of 50 in 1968. The reason was a many-sided safety program featuring modern devices and old-fashioned attention to detail.

The challenge: Dig a tunnel over 8.5 mi. long and 10 ft. in diameter. Line it with concrete. The conditions: mountainous, difficult terrain in a remote area; methane gas in potentially explosive quantities and dust that can choke men and machine alike. Complicate with ground that can collapse. Throw in a tight deadline, rigid line and grade specifications, and the clincher - do it safely! Now do that at a competitive price. Who wants it?

Well, when the U.S. Bureau of Reclamation advertised such a job in March 1965, five firms wanted it. And Colorado Constructors and A. S. Horner, the contractor that got the job, not only met the challenge but set some notable records in production and safety. The "secret" was a tunnel boring machine and all the equipment needed to back it up: crews of miners, laborers, motormen, carpenters, foremen, shifters, engineers, electricians, superintendents, one safety engineer and two first-aid men.

Starting in March 1966, the contractor required just over a year to punch the Blanco Tunnel through, beginning at the Little Navajo River in northern New Mexico and drilling upstream to the Blanco River in southern Colorado. Not a single totally or permanently disabling injury occurred during the excavation. In fact, in more than one million man-hours invested on the job, the contractor obtained a 5.9 accident frequency rate. (The frequency rate is the number of injuries resulting in lost time for each million man-hours of work.)

The contract incorporated a requirement for the contractor to submit a safety program based on provisions in the Bureau of Reclamation manual "Safety Requirements for Construction by Contract." Other provisions were discussed among Bureau and contractor's supervisory personnel at the preconstruction conference and at monthly joint safety policy meetings throughout the duration of the contract.

Now that the project is completed, one thing is clear; an involved job of underground and surface work can be accomplished safely and efficiently if the right tools are used. In this case the "tools" included



competent supervision; expert advice from State and Federal organizations; correct and regular use of atmospheric monitoring equipment; supervisor's weekly on-the-job safety meetings; periodic first-aid training; and regular inspections by contractor's supervisors and Bureau of Reclamation personnel.

At any indication of a hazardous condition developing, immediate action was taken to correct the condition. Most of the explosive gas periodically encountered during moling was effectively dispersed with compressed air hoses without interruption of operations. On one occasion, gas in the general atmosphere reached an explosive concentration. As a spark could have meant disaster, the men were removed from the tunnel.

The situation called for help from the pros - in this case the Bureau of Reclamation's chief safety engineer, Howard Latham, and specialist A. C. Moschetti, assistant district manager for the U. S. Bureau of Mines. Their inspection resulted in even more stringent atmospheric monitoring; auxiliary ventilating tubes and compressed air were introduced at the heading; and restrictions on welding, burning and smoking were put into effect. Mainly as the result of such typical precautions, not one lost-time accident resulted from the presence of flammable gases, dust or any other problems connected with ventilation in the tunnel.

With the exception of a fraction of a mile excavated by conventional methods through unstable ground, the contractor used his mole to advantage in the remainder of the tunnel, setting excavation records of 375 ft. in one day and 6,713 ft. in one month. Not resting on these accomplishments, he followed up with consistently fine progress in preparing for and placing concrete lining the length of the tunnel in a 15-month period; again doing the job with full consideration for safe performance. As indicated, some accidents, including first-aid-only-type cases did occur. The contractor's safety engineer, Elmer W. Nord, sleuthed these thoroughly to determine if any particular type of accident was recurring and what supervisors were in charge at the time. With such detail he then proceeded to concentrate the attention of foremen - and the men they supervised - where it was most needed.

While safety activities during lining were not unique, they were carried on with the same seriousness of purpose as during excavation, because it was evident these efforts paid off. During the 13-month excavation period, contractor's personnel knew that men working miles underground do not have easy or immediate access to professional medical attention - particularly when the nearest doctor is 90 mi. away. Therefore, every foreman and every supervisor was required to complete the standard Bureau of Mines first-aid course every calendar year. Knowledgeable instructors from the U.S. Bureau



of Mines, Bureau of Reclamation, and Colorado Department of Mines conducted numerous classes. All other employees were encouraged and given some time off to take the life saving course.

Instruction was provided as well in the use of oxygen breathing equipment for rescue; heat exhaustion and electrical shock hazards were ever present. Additionally, all supervisors were provided a course in gas detection by the U. S. Bureau of Mines; other employees were included. Naturally, this instruction came early in the moling work. Actual tests of the effectiveness of the course were given by use of sample tanks of gas.

At about monthly intervals, State and Federal mine inspectors checked the tunnel, taking dust counts and ventilation measurements. These inspections and tests were in addition to those conducted almost daily by contractor and Bureau of Reclamation personnel. Based on their observations, fog nozzles were added and booster fans were installed in vent lines or to redirect air where needed to reduce the dust count. With the introduction of water spray at the heading, humidity rose, and this was coupled with rock temperatures as high as 93 deg. and atmosphere temperatures of 120 deg. in the mole area. Air conditioning units placed at the heading gave relief in the immediate area, dropping temperatures about 10 deg.

The contractor also cooperated in testing an experimental methane detector provided by the U. S. Bureau of Mines. The device was installed and operated from the "mole." From this experience suggestions were provided on use of the detector. Shortly afterward, the U. S. Bureau of Mines approved the machine for commercial production and to carry the Bureau's approval seal. These and numerous other activities evidenced the firm intention of the contractor's management to comply with established Bureau of Reclamation "Safety Requirements for Construction by Contract" and to make their efforts serve the real purpose of saving lives, minimizing personal injuries, and in general, facilitate operations.

Contractor's staff primarily responsible for accomplishing a safe job were H. C. "Duke" Miller, project manager during excavation; Lawrence E. Handford, project manager during lining operations; Safety Engineer Nord; and Chris Eastin, overall job manager for the joint venture. Cooperating with the contractor and administering the contract for the Bureau of Reclamation under direction of Project Construction Engineer D. E. Cannon were Cecil E. Tackett, chief of the Chama construction division; Phillip B. Lankford, supervisory technician in charge of inspection; and Carroll R. Murphy safety officer.

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## RECLAMATION SERVES THE NATION

More than \$1.8 billion worth of crops were harvested on Western lands irrigated by Reclamation projects during 1968. During the year, Bureau of Reclamation projects served a total of 24 million acre-feet of water (7,831.7 billion gallons) to 8.4 million acres, which produced an average of \$219 worth of crops per acre, up \$3 per acre over the 1967 figure.

Water service from all units was provided to some 15.5 million people during 1968, an increase of 327,000 over the 1967 figure. Of this total, 853,000 received irrigation water for use on urban, suburban, commercial and industrial lands; and 573,000 people residing on full and part-time farms received irrigation service on their lands.

As of June 30, 1968, the Federal investment in Reclamation projects totaled \$5 billion, less than 18 percent of the \$28.6 billion worth of crops produced on these irrigated lands since 1906. About \$1 billion, one-fifth of the total cost of the Reclamation program - including such "nonreimbursable" items as flood control, fish and wildlife enhancement, and recreation (partially reimbursable) as well as irrigation, municipal and industrial water service and hydropower generation, which are reimbursable - has already been directly repaid to the U.S. Treasury through sales of water and power.

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## CARELESS SMOKING

Smoking carelessness consistently tops the list of fire causes, according to National Fire Protection Association studies.

Unfortunately, we almost always blame the match and cigarette rather than the careless, unthinking person who used them.

The rules of smoking safety are simple and pure.

Make certain matches and cigarettes are completely out before you dispose of them.

Keep plenty of ashtrays around the home and office - large, deep ashtrays designed so a burning cigarette can't fall out. Always use the car ashtray when driving.

And if you smoke in bed or any time you're drowsy, don't. The bedding and clothing fires thus started cause hundreds of deaths yearly. Break the habit before it buries you!

# RECORD OF PUBLIC DROWNINGS

January 1, 1969, through September 30, 1969

## Bureau-operated Facilities:

Dams	2
Canals	25
Reservoirs	<u>2</u>
Total	29

## Facilities Operated by Others:

Irrigation and Water Districts	28
State or County (Recreational)	<u>34</u>
Total	62

## Summary of Total Drownings During Period:

By Operating Agency:	
Bureau of Reclamation	29
Irrigation and Water Districts	28
State or County (Recreational)	<u>34</u>
Total	91

By Type of Facility:	
Dams	4
Canals	49
Reservoirs	<u>38</u>
Total	91

By Activity:	
Swimming	27
Boating	14
Fishing	6
Fell into water	17
Other	<u>27</u>
Total	91

By Age:	
Under 12 years of age	15
From 12 to 25	36
From 25 to 50	23
Over 50 years of age	<u>17</u>
Total	91

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# VEHICLE SAFETY

## OFF-THE-JOB-ACCIDENT AUTOMOBILE BATTERY EXPLOSION

Booster cables were used to start a car while the temperature was about 15° below zero. The cables were properly connected; however, as the last connection was being made, the battery exploded. Battery debris and acid flew in every direction. All exposed skin was washed immediately so that there were no body injuries from the acid, although clothing was damaged by it. The only personal injury suffered was a cut nose caused by flying debris.

Jumping car batteries is becoming extremely common and is usually done under rushed conditions and in extreme cold. Few people realize how dangerous this is and that there is a method which lessens the chance of a battery exploding.

Hydrogen gas buildup inside the battery sets the stage for an explosion. This is especially prevalent if the battery water is low, which allows space for the hydrogen gas to be trapped. Whenever a battery is being charged, hydrogen is being generated. Any spark in or near the outside of the battery will explode the gas.

To minimize the hazard of a car battery exploding:

1. Remove the cell caps from both batteries to vent the trapped gas and leave them off during the jumping process.
2. Determine whether the car to be aided has a positive or negative grounded electrical system. A positive grounded electrical system has the positive terminal of the battery connected to the engine block or chassis.
3. Connect both cables to the live battery.
4. Connect the proper cable to the dead battery terminal which is not grounded (negative-to-negative or positive-to-positive).
5. Connect the remaining cable to a convenient chassis or engine block location away from the battery.
6. As an added precaution, cover the battery with heavy material, such as a piece of carpeting, while connections are being made.

This procedure is designed to prevent sparking near the battery terminals and damage to the alternator.



## WHIPLASH INJURIES

Women in metropolitan areas suffer whiplash injuries in auto accidents at a rate almost five times that of men, according to a study by Drs. Charles H. Schutt and F. Curtis Dohan reported recently in the Journal of the American Medical Association.

Slender women tended to have longer disability, and this suggests that muscle strength may be a factor, say the researchers. They also note that women more frequently occupy the right-hand portion of the front seat where, without rear-view-mirror warning, they have less opportunity to tense their neck muscles in anticipation of a rear-end collision.

Other researchers found "moderate to marked" brain damage in 21 of 45 whiplash patients who did not have direct head injuries.

Data from accidents and from experimental crash research indicate that properly designed headrests in cars will reduce whiplash and other possible neck injuries. Noting that cars built from the beginning of this year are required to have the headrests, the doctors recommend that owners of older cars have them installed, especially if they drive in metropolitan areas, because of the high incidence of such injuries.

The cushion behind the driver and front-seat passenger of a late-model automobile is a head restraint, not a headrest, says Roy Haeusler, Chrysler Corporation's chief engineer - automotive safety.

Demonstrating the proper positioning of the restraint, he added, "It should be high enough to support the head, not just the neck, in case of an impact." Drivers should adjust the head restraint position according to their height in order to gain the greatest benefit from the new safety equipment.

\* \* \* \* \*

After many months of courtship, a girl dismissed her suitor with the statement that she could not think of marrying him until he had a few thousand dollars.

A few months later she met him and asked how much he had saved up.

"Thirty-five dollars," was the reply.

"Well," she said with a blush, "I guess that's close enough."

## MOTOR VEHICLE STEERING WHEEL DEFECTS

--From Bureau of Motor Carrier  
Safety Bulletin

Ever try to drive a truck without a steering wheel? An impossible task . . . not to mention ridiculous. Then, let's suppose the steering wheel is there but the rest of the steering system is being held together with bailing wire and chewing gum. How safe would the vehicle be? Absurd as these statements may appear, there are trucks being operated on the highway today with steering mechanisms in such deplorable condition they should be classified as "dangerous weapons."

During 1968, the Safety Investigators of the Bureau of Motor Carrier Safety found 586 vehicles being operated with defective steering systems. A total of 203 of these vehicles, or 34.6 percent, had such defective steering systems that the vehicles were ordered "Out of Service" until repairs could be made.

It is fine that these 203 vehicles could be stopped before an accident occurred . . . but what about the thousands of other vehicles operating on the highway that our limited field staff were not able to stop before an accident resulted? This question can be partially answered by an examination of the accident reports filed by motor carriers to this Department. During 1968, reports were received on 90 accidents involving vehicles with defective steering systems. These accidents resulted in three people being killed, 51 injured, and \$458,687 property damage. A closer study of these reports shows that 30 resulted from defective linkage rod, drag-link, etc., 20 from steering wheel and steering shaft defects, and three from power steering defects, and two resulted from steering gear failure.

Because accidents caused by steering system failures are usually more serious than other mechanical defect accidents, motor carrier shop personnel should spend sufficient time to check the entire steering system as a part of routine maintenance. You can never tell when excessive play at the steering wheel is caused by the need for a simple steering gear adjustment, or a defective ball joint, or perhaps loose steering gear mounting bolts which could fail at any moment. It is easier to check the system and make minor adjustments or repairs before a trip than have a careless oversight result in a serious and costly accident.

\* \* \* \* \*

## NOISE CONTROL

The Bureau has issued a new Part 376 - Environmental Quality - Preservation and Enhancement - to the Reclamation Instructions. New Part 376 sets forth policies and procedures relating to preservation and enhancement of environmental quality. Included are chapters on the Bureau's improved appearance program, air pollution abatement, and the noise control program.

Chapter 9 Noise Control of Reclamation Instructions Part 376 is quoted as follows:

Noise Control Program. Bureau operations do not ordinarily present a noise-level problem to either Bureau personnel or the public. However, a Noise Control Program initiated by the Bureau in 1968 provides for sound surveys to be conducted at all Bureau facilities where high noise levels could present a hazard to persons. Special attention is given to elements of the Bureau's activities that are associated with the operation of mechanical and hydraulic machinery. Special studies are made to determine what types of acoustical treatment are best suited to eliminate harmful or bothersome noise levels. The studies are also utilized to contribute to the knowledge of the effectiveness of design criteria currently being followed to reduce noise levels in the Bureau.

Noise-level Thresholds. The program sets forth safe noise-level thresholds and provides for frequent monitoring in order to protect Bureau personnel and the public from harmful noise levels. Safe noise-level thresholds have been established; and trained personnel are available in each region to monitor operations or areas where high noise levels are suspect, and to apply necessary environmental noise control criteria.

\* \* \* \* \*

There is nothing under God's Heaven that justifies your creation or your citizenship but this gospel -- that the next greatest thing to creating a life is to save a life.

- Charles E. Woodcock

REMARKS BY  
HOWARD S. LATHAM, CHIEF SAFETY ENGINEER  
BUREAU OF RECLAMATION  
BEFORE THE IDAHO GOVERNOR'S SAFETY CONFERENCE  
BOISE, IDAHO - OCTOBER 14, 1969

THE PART WE PLAY

It is my pleasure to meet with so many fine representatives of an industry that has been responsible for turning Reclamation's plans and specifications into reality. In fact, the development of America has been largely due to the efforts of contractors and builders. Through your efforts our designs become dams, canals, power-plants, and transmission lines - all contributing to the beneficial utilization of America's most precious natural resource - WATER! Practically 100 percent of these projects are built by private contractors, and approximately 90 percent of the expenditure for this vital public works program is repaid to the U.S. Treasury - most with interest.

The ability to meet and resolve difficult and challenging problems has been the hallmark of the industry and those associated with it. Today the industry must meet the challenge of improving a safety record that has been consistently poor. Year after year the industry suffers one of the highest injury rates, claiming an average of 2,600 lives and 250,000 disabling injuries. The human suffering, economic loss, and the public criticism resulting from a poor safety record is a price the industry cannot afford to pay.

One result of the public criticism and concern has been the recent safety legislation enacted by the U.S. Congress which affects all Federal and federally financed construction projects. Significantly, the prevailing mood of the Congress suggests that more Federal and state regulatory safety enactments will follow. It should be crystal clear to all of us in the industry that if we don't take the initiative to improve the record ourselves, it is certain that the Government will attempt to do it for us.

The responsibility for safety in the construction industry should lie with the contractors, labor, owners, and Government agencies administering public work projects. These are the principals responsible for the stewardship of the industry. - These are the members of the team who must meet the challenge of improving the safety record - and applying the brakes in the drift toward regulatory safety legislation.



My discussion deals primarily with the part the Bureau of Reclamation and other Federal agencies play, or should play, in meeting this challenge. I might add that Reclamation is not out of character in the following script since we are presently attempting to play the part portrayed.

Contractors working for the Bureau of Reclamation have comparatively good safety records. Their average accident frequency rate over the past 3 years was 13.7, which is less than one-half of the rate for heavy construction published by the U.S. Department of Labor. While we are not satisfied and believe a further reduction is possible, there is satisfaction in the knowledge that construction workers are safer when employed on Reclamation projects. I am not pointing to this accomplishment to extol our safety record, but simply to indicate to you that the concepts of safety management I am going to discuss are effective in reducing construction accidents.

First, I should explain why Federal agencies have a part to play in construction safety. Federal agencies engaged in public work have a legal and a moral obligation to provide for the safety of the people who perform the work. A number of years ago the Secretary of the Interior, under the rulemaking authority of The Reclamation Act, directed the Commissioner of Reclamation to initiate and carry out a comprehensive accident prevention program. It was stipulated that the program would provide for the promulgation of health and safety standards covering all Reclamation activities, including construction by contract. This year the 91st Congress, in amending the Contract Work Hours Standards Act, placed a similar obligation on all Federal agencies responsible for public works.

Federal agencies are also financially involved since the Government must bear the increased costs which result from accidents and which are reflected in higher bids. Further, since the passage of the Federal Tort Claims Act the Government is subject to third party claims and suits to the same extent as the owners, architects, and engineering firms. As a result, we are faced with an increasing number of claims based on the allegation that the Government, as the owner, failed to provide a safe work environment and was negligent in the enforcement of construction safety standards. Many trial lawyers argue that the prime responsibility for safety lies with the owner, not the contractor. This evolves from the contention that the owner, not the contractor, undertakes the construction, and as the principal he cannot delegate the obligation to insure that the work is done safely. Regardless of the merit of this argument - the financial consideration, the existing Federal legislation, the ever-mounting liability, plus the moral inducement - clearly dictate the necessity for our involvement.

## THE FEDERAL AGENCY AND CONSTRUCTION SAFETY

Today it is essential that any Federal agency directing public work projects considers safety as an integral function of responsible contract administration. This responsibility must begin in the project planning and design stage. Those responsible for the planning, design, drafting the specifications, and the preparation of the estimate must consider and provide for safety during the construction of the project.

As a result, every contract specification should contain practical and relevant safety requirements specifically covering the operations involved. These requirements should be set forth in such manner that the contractor can estimate their cost and include it in his bid. Additionally, there should be a provision assuring that the contractor will initiate and carry out an effective safety program. The contract specifications also should spell out the penalties for ignoring or disregarding the contractual health and safety requirements.

In the Bureau of Reclamation we attempt to fulfill this obligation by incorporating a health and safety clause in the General Conditions of every construction contract. This clause requires the contractor to: (1) Submit a proposed safety program for approval prior to the start of construction; (2) Designate a competent supervisory employee to administer the safety program; (3) Hold monthly supervisory safety meetings attended by all levels of job supervision; (4) Require each foreman to conduct a weekly 5-minute "tool-box" safety meeting for his crew, and (5) Provide first-aid facilities and trained personnel for prompt and effective care of injured employees. In addition, this standard clause requires that the contractor comply with the safety requirements set forth in the Bureau of Reclamation safety publication entitled Construction Safety Standards.

Construction Safety Standards contains consensus health and safety standards for the industry. It is revised frequently in order to keep abreast of the innovations and changes taking place in the industry - Changes in construction materials, equipment, methods of operation, and also in human environmental concepts. The Associated General Contractors of America, the American National Standards Institute, equipment manufacturers, labor and contractor representatives assisted in the promulgation of these health and safety standards. We consider this safety publication a team effort and point to it as an example of what can be accomplished in the industry by working together.

The latest edition of Construction Safety Standards, published in June 1968, contains 27 sections of safety standards covering virtually all operations encountered in heavy construction, including surface

and underground excavation, concrete placement, structural steel erection, welding and cutting, transmission line construction, equipment operation and maintenance, and fire prevention and protection.

The following standards, recently added, are indicative of the changes taking place in the industry: Provision is made for the installation of rollover protective structures and emergency braking systems on high-speed off-highway earthmoving equipment, specifically scrapers, trucks, and front-end loaders. Roll-bars are required on farm and industrial-type tractors, and seat belts are installed on all machines equipped with rollover protective structures. Self-propelled tractors, loaders, and similar crawler-type machines on Reclamation jobs are now equipped with protective canopies meeting specific design criteria.

To my knowledge, the Bureau of Reclamation, together with the California Division of Industrial Safety and the Corps of Engineers, shares the distinction of having pioneered in the installation of rollover protection on earthmoving equipment. While there never was any question in our minds for the need for this protection, particularly on high-speed earthmoving equipment, frankly, some of the initial criticism and controversy gave us cause for reflection. However, subsequent acceptance by the Associated General Contractors of America, the Construction Industry Manufacturers Association, and numerous contractors helped allay these reservations. The first real breakthrough came when several major equipment manufacturers started making rollover protective systems. For example, Caterpillar Tractor Company is now manufacturing and selling rollover protective structures for installation on their Model 920 and 930 wheel loaders. They will soon have a rollover protective structure (ROPS) available as optional equipment for their D-9 tractors. Another milestone was reached when the Society of Automotive Engineers developed and published standards for rollover protection.

Almost as gratifying is to visit a construction site today and to observe drillers working in a dust-free surrounding due to our requirement for dust control systems on percussion-type drills. This improvement has resulted in better job efficiency as well as improved health and safety - Added proof that safety and job efficiency usually go hand in hand.

While progress is being made, there is much more to be done, particularly in the field of environmental health. Take a moment and seriously consider the problem of distracting and harmful noise levels found on most jobs, debilitating heat often encountered in the operation of equipment, and - probably the most pressing - is the absence of physical examinations to determine



whether or not an employee can perform his work without endangering himself or others. These are only a few of the unresolved problems associated with environmental health that currently challenge the ingenuity of those responsible for safety in the industry.

If the contract covers special or particularly hazardous operations not covered in Construction Safety Standards, it is necessary to incorporate additional safety requirements in the contract specifications. For example, Reclamation contracts covering tunnel excavation, transmission line construction, and work in energized substations contain safety requirements pertaining to the specific operation. These requirements are set forth in sufficient detail to permit contractors to place a price tag on them in preparing their bids. Unfortunately, too many contractors neglect to do this - and, as a result, safety is compromised or the contractor bears the cost.

On all Reclamation contracts the responsibility for enforcement of the health and safety requirements is the direct responsibility of the construction engineer. He is required to enforce the health and safety standards in the same manner as other contract requirements. Consequently, in Reclamation the same emphasis is placed on safety as on the quality of the product and the timely completion of the work. Day-to-day inspection to insure compliance with the health and safety requirements is the responsibility of the job inspectors. In this manner safety becomes an integral part of contract administration, and it is not necessary to employ safety inspectors. Every work inspector is, in effect, a safety inspector per se - responsible for the enforcement of the safety requirements on all work under his direction.

The construction engineer - as the representative of the contracting officer - has the authority to suspend all or any part of the work if the contractor fails or refuses to comply with the safety requirements. Since we sincerely believe that effective safety must be a team effort, we prefer to have the contractors' cooperation and voluntary compliance. However, we expect our construction engineers to exercise the enforcement provision when it is apparent that it is the only way to obtain the contractors' compliance. This is compatible with our contract administration policy - which is based upon the premise that all contractors be treated uniformly and equitably. Permissiveness is not compatible with this policy, and, if permitted, can only result in deserved criticism, increased construction costs, undesirable safety legislation, and expensive and embarrassing litigation. - As a result, everyone is a loser.



## IMPACT OF THE CONSTRUCTION SAFETY ACT (PUBLIC LAW 91-54)

Jack Williams asked me to discuss the probable impact of the Construction Safety Act on the construction industry. First I should point out that the provisions of the Act cover federally financed and federally assisted construction, in addition to Federal public works projects. Eventually all Federal construction contracts in excess of \$2,000 will contain a provision requiring compliance with health and safety standards promulgated by the Secretary of Labor. The Act provides for cancellation of the contract and prohibiting the award of future contracts for a period of 3 years in event a contractor or subcontractor willfully or negligently violates the provisions of the Act.

Fortunately, due to the efforts of many of us in the industry, the Act, as passed, is not as impractical and costly to administer as it appeared originally. However, I am still disappointed in the penalties provided under the Act. They are largely punitive in nature and - more important - it is doubtful that they will be effective in assuring prompt and continuing compliance with health and safety standards - which is the obvious intent of the legislation. Fredrick Herzberg, a popular psychologist who has written many articles on motivation, would probably point to them as an example of "Negative KITA": As such, they are inelegant and destroy the precious image of benevolence which most Government agencies wish to reflect.

Prompt suspension of the work by the contracting officer - while also an application of "Negative KITA" - is more realistic and effective than the threat of cancellation of the entire contract, following time-consuming hearings and appeals. In enforcing the safety provisions of the Walsh-Healey Public Contracts Act, the threat of contract cancellation has been largely ineffective and has actually proven to be more bark than bite. However, don't take too much consolation in this, since I am sure we will continue to suspend the work, which we can do contractually, if you don't shape up.

If properly administered, the provisions of the Act will permit a logical and effective approach for improving the safety record on federally constructed projects. I say this because, fortunately, the language of the Act is broad enough to permit the respective agencies to administer their own safety programs, including the responsibility for enforcement of the safety standards. In fact, it is similar to the manner in which the provisions of the Davis-Bacon Act, the Copeland Act, and the Contract Work Hours Standards Act are currently being administered - and to the manner in

which Reclamation and other responsible agencies presently administer safety. In other words, I don't anticipate any substantial changes in the administration of our construction safety program.

It is in the best interests of both the contractors and the Government to leave the administration of contract health and safety in the hands of the respective agencies. Further, this policy serves both practicality and economy as well as insures effective results. Most Federal agencies already possess personnel with the experience and expertise to get the job done - without resorting to employment of a "cadre" of roving safety inspectors.

You can expect a definite change in the manner in which less safety conscious agencies have been treating safety in the past - particularly on federally assisted construction projects. Federal agency heads will be obligated to conduct an effective construction health and safety program and enforce the standards established by the Secretary of Labor. As a result, effective accident prevention will become a contractual obligation on all Federal construction contracts. Safety will become an integral part of the contract to be considered and reckoned with.

Realistically, the health and safety standards, promulgated by the Secretary of Labor, are the essence of the Construction Safety Act. Until these standards are promulgated, I doubt that the legislation will have any significant effect on the industry or on its safety record. On the other hand, this should be the area of greatest concern to those responsible for the stewardship of the industry, particularly the contractors.

It is essential that the health and safety standards be realistic and practical - and clearly and concisely cover all construction operations. In establishing an Advisory Committee, representing management, labor and the public, the drafters of the Act recognized the need for consensus standards. Hopefully, extensive reference will be made to health and safety standards published by the American National Standards Institute, the National Safety Council, the Associated General Contractors of America, progressive State Industrial Commissions, responsible Federal agencies having existing standards, and similar recognized sources. My advice is that you make every effort, through your contractor association, to assure yourself that the contractors are represented on the Advisory Committee by experienced and competent people. Also, that the three public representatives possess the professional and technical competency and experience "in the construction health and safety field" envisioned by the Act.

Optimistically, I hope this will be an area where labor and management will cooperate for the benefit of the entire industry.

## HOW A SMALL CONTRACTOR CAN IMPROVE HIS SAFETY RECORD

Since others will discuss this subject, and there have been literally millions of words spoken and written on how to conduct a safety program, my remarks on the subject will be brief. In fact, I believe action is needed more than words. However, I'm going to quote what a few of the speakers at the 1968 AGC National Safety Conference had to say on the subject.

Mr. Joseph A. Courter, President, Courter & Company - on Safety Management: "First, top management of any contracting firm should demonstrate a strong, sincere interest in safety. The chief executive officer of such an organization must think 'safety first' and mean it! Progressive management must change its concept of safety - recognize its value - and broaden its responsibilities. A strong policy statement from the chief executive officer to all employees should kick off the company's safety program. .... On any construction project the foreman is the key to the success of the safety program. The foreman must realize that his performance is being judged on the basis of the safety record of his crew - equally as much as on the speed or quality with which the work is done."

Mr. Clarke J. Potter, Ruby Construction Company - on Field Safety Supervision: "A small company cannot justify a full-time safety engineer. The general superintendent is the proper and logical man to have the responsibility for the execution of the safety program. .... The written safety program becomes supervision's specification and, if prepared properly, will clearly define the limits, responsibilities, and duties of each supervisor with respect to safety."

Mr. Hunter P. Wharton, General President of the International Union of Operating Engineers - on Employee Participation: "In a free society a worker cannot be forced to share and respect authority. However, when supervision and management in good faith offer a worker the chance to participate in an Accident Prevention Program, the first step has been taken towards developing attitudes directed towards safe practices."

Mr. Robert O. Nimmo, Safety Director, Peter Kiewit Sons' Company - on Estimating for Safety: "Accident prevention requirements must be carefully analyzed during preparation of the estimate and adequate sums included to provide for items such as trench bracing, barricading, signing, personal protective equipment, adequate work platforms and other items as applicable for the protection of employees, company equipment and materials, as well as members of the general public and their property."

Mr. B. P. Bellport, Chief Engineer, Bureau of Reclamation - on Safety Training: "Contractors must devote more time and effort in providing



effective accident prevention training for foremen and superintendents. The Associated General Contractors have made an impressive start in the development of the Safety Training Course for Construction Supervisors. "

I endorse all of these recommendations, and suggest that you carefully consider these ideas in your efforts to reduce accidents. These, and many more ideas, which contractors have found effective in their safety efforts, were discussed at the 1968 AGC National Safety Conference. You can secure a copy of the conference discussions from your AGC Chapter or from the national headquarters of the Associated General Contractors of America, 1957 E Street, N.W., Washington, D.C. 20006. I recommend it as serious reading for those genuinely desirous of doing something about the situation.

I would like to add a recommendation of my own. I believe all AGC Chapters should consider adopting a safety training and job inspection program similar to the one recently initiated by the Seattle Northwest Chapter of the AGC. Utilizing instructors from insurance companies, the Seattle Fire Department, the University of Washington, and industry, they are making a concerted effort to enroll more and more construction supervisors in the AGC safety course. Equally effective is their program of on-site safety inspections - over 500 in a 6-month period. These inspections, used to spot hazardous conditions and call them to management's attention, are conducted by an experienced safety engineer employed by the Chapter. This program is expensive, but according to Chapter officials, it has resulted in the first substantial reduction in the Chapter's accident frequency rate: 45.5 to 31.2.

Speaking of expense - effective safety isn't cheap - it costs money. Like anything else worthwhile, it doesn't come for free - but the price tag is necessary and the results worth the price. In addition to the reduction in deaths and injuries, the rewards are significant. Secretary of Transportation John A. Volpe appeared to put it all together with the following remark, made at the AGC Safety Conference: "Men working under safe conditions produce more than those working under hazardous conditions. Better production means profit on a job and tends to lower costs. Lower building costs are a gain for the community, the contractor, the employee, as well as the national economy. "

Let's go to work - and make safety the first order of business.

\* \* \* \* \*



# SAFETY PERFORMANCE RECORD

## CUMULATIVE QUARTERLY REPORT GOVERNMENT FORCES

3rd QUARTER, 1969

PERIOD FROM JANUARY 1, 1969 THROUGH September 30, 1969

REPORTING OFFICE	NUMBER OF EMPLOYEES	MAN HOURS	DISABLING INJURIES		DAYS LOST	FREQUENCY RATE	SEVERITY RATE
		CUMULATIVE THIS YEAR	CUMULATIVE THIS YEAR	FATAL *	CUMULATIVE THIS YEAR	CUMULATIVE THIS YEAR	CUMULATIVE THIS YEAR
Washington Office	316	488,160					
Denver Office	1,348	2,686,756					
REGION 1							
Boise Regional Office	181	221,223					
Central Snake Project	39	56,074	1		47	17.8	838
Chief Joseph Dam	36	56,355					
Columbia Basin Project	683	1,093,512	3		53	2.7	48
Green Springs Powerplant	2	3,043					
Hungry Horse Project	47	61,145					
Lower Columbia Development Office	55	74,105					
Lower Teton	8	11,630					
Minidoka Project	69	108,711	1		114	9.2	1,049
SNAKE RIVER DEVELOPMENT OFFICE	56	88,617					
Third Powerplant	195	279,072	1		2	3.6	7
Upper Columbia Development Office	45	61,200					
Wild Horse Dam		7,499					
Yakima Project	32	42,762					
Totals & Averages	1,448	2,164,348	6		216	2.8	100
REGION 2							
Sacramento Regional Office	576	982,546	2		5	2.0	5
Regional Drill Crew	39	65,459	1		16	15.3	244
Auburn-Folsom South Unit	202	299,343					
Cachuma Operations Field Branch	2	4,208					
Central Coast Dev. Field Branch	4	4,322					
Folsom Field Division	75	115,496					
Fresno CVP Construction Office	143	198,545	1		6	5.0	30
Fresno Field Division	140	211,704					
Klamath Project Office	19	30,708					
Lahontan Basin Projects Office	57	83,856					
Napa Development Field Branch	2	4,384					
Sacramento Valley CVP Constr. Office	117	178,291					
San Luis Unit CVP Constr. Office	90	212,867					
Shasta Field Division	143	225,349	1		18	4.4	80
Solano Operations Field Branch	3	4,452					
Tracy Field Division	164	253,872					
Upper North Coast Dev. Field Branch	3	5,808					
Totals & Averages	1,779	2,881,420	5		45	1.7	16
REGION 3							
Boulder City Regional Office	188	289,580					
Boulder Canyon Project	141	229,580					
Dixie Project Office	5	7,226					
Lower Colorado River Project	203	286,680	1		135	3.5	471
Mead Construction Office	12	32,899					
Parker-Davis Project	345	533,035	1		30	1.9	56
Phoenix Development Office	93	134,400	1		135	7.4	1,004
Southern California Dev. Office	20	25,250					
Southern Nevada Water Project	79	118,601					
Transmission Lines Office		8,760					
Yuma Projects Office	131	190,562					
Totals & Averages	1,217	1,856,052	3		300	1.6	162
REGION 4							
Salt Lake City Regional Office	214	345,018	1		5	2.9	14
Central Utah Project	179	269,874					
CRP Power Operations Office	266	402,378	2		25	5.0	62
Curecanti Unit	90	118,134	1		5	8.5	42
Durango	26	37,476					
Grand Junction	50	75,412	1		2	13.3	27
Logan Development Office	5	11,960					
Lyman Project	30	38,522					
Upper Green River Dev. Office	23	34,200					
Weber Basin Project	3	19,014					
Totals & Averages	886	1,352,058	5		37	3.7	27
REGION 5							
Amarillo Regional Office	92	138,357					
Albuquerque Development Office	33	48,765					
Austin Development Office	45	70,692					
Canadian River Project		838					
Lower Rio Grande Project	1	2,200					
Middle Rio Grande Project	222	332,901					
Navajo Project	71	116,649	1		5	8.6	43
Oklahoma City Development Office	20	25,765					
Pecos River Project	13	16,097					
Rio Grande Project	216	323,279					
San Juan-Chama Project	75	113,277	1		10	8.4	84
Totals & Averages	789	1,196,321	2		15	1.7	13
CONSOLIDATED TOTALS							
TOTALS LAST YEAR (19 )							

\*FATALITIES INCLUDED IN TOTAL DISABLING

# SAFETY PERFORMANCE RECORD

## CUMULATIVE QUARTERLY REPORT GOVERNMENT FORCES

3rd QUARTER, 1969

PERIOD FROM JANUARY 1, 1969 THROUGH September 30, 1969

REPORTING OFFICE	NUMBER OF EMPLOYEES	MAN HOURS	DISABLING INJURIES		DAYS LOST	FREQUENCY RATE	SEVERITY RATE
		CUMULATIVE THIS YEAR	CUMULATIVE THIS YEAR	FATAL *	CUMULATIVE THIS YEAR	CUMULATIVE THIS YEAR	CUMULATIVE THIS YEAR
REGION 6							
Billings Regional Office	156	227,040					
Geology and Drill Crews	10	11,143					
Canyon Ferry Project	19	26,151					
Fort Peck Project	39	55,530					
Missouri-Oahe Projects	238	332,640					
Missouri-Souris Projects	316	400,312					
Power System Operations Office	51	76,720					
Riverton Project	4	5,840					
Upper Missouri Projects	61	106,560	1		10	9.4	94
Yellowtail Construction Office		16,514					
Yellowtail Project Office	38	55,183					
Totals & Averages	932	1,313,637	1		10	0.8	8
REGION 7							
Denver Regional Office	181	291,608	1	1	6,000	3.4	20,576
Fryingpan-Arkansas Project	148	263,864					
Glen Elder Construction Office	32	62,080					
Kansas River Projects	96	151,016					
Niobrara-Lower Platte Dev. Office	30	45,024					
North Platte River Projects	234	375,896	2	1	6,120	5.3	16,201
South Platte River Projects	165	242,312					
Totals & Averages	886	1,431,800	3	2	12,120	2.1	8,465

# SAFETY PERFORMANCE RECORD

## CUMULATIVE QUARTERLY REPORT CONTRACTOR FORCES

3rd QUARTER, 1962

PERIOD FROM JANUARY 1, 1962... THROUGH September 30, 1962...

REPORTING OFFICE	NUMBER OF EMPLOYEES	MAN HOURS	DISABLING INJURIES		DAYS LOST	FREQUENCY RATE	SEVERITY RATE
		CUMULATIVE THIS YEAR	CUMULATIVE THIS YEAR	FATAL *	CUMULATIVE THIS YEAR	CUMULATIVE THIS YEAR	CUMULATIVE THIS YEAR
REGION 1							
Chief Joseph Dam	24	37,553	1		21	26.6	559
Columbia Basin Project	74	156,758	4	1	6,184	25.5	39,449
Green Springs Powerplant		256					
Hungry Horse Project		99					
Lower Teton	16	8,500					
Minidoka Project	13	5,555					
Third Powerplant	305	767,150	6		336	7.8	438
Wild Horse Dam		2,584					
Yakima Project		2,022					
Totals & Averages	512	987,477	11	1	6,541	11.1	6,624
REGION 2							
Auburn-Folsom South Unit	147	153,819	1		5	6.5	33
Folsom Field Division	5	178					
Fresno CVP Construction Office	287	285,100	2		11	7.0	39
Fresno Field Division		8,669					
Lahontan Basin Projects Office	108	104,964					
Sacramento Valley CVP Constr. Office	134	83,595					
San Luis Unit CVP Constr. Office	172	213,936	1		21	4.7	98
Shasta Field Division	5	184					
Tracy Field Division	6	3,072					
Totals & Averages	867	853,517	4		37	4.7	43
REGION 3							
Boulder Canyon Project	7	7,094					
Lower Colorado River Project	25	34,372					
Mead Construction Office	2	25,505	3		40	117.6	1,568
Parker-Davis Project	87	64,109					
Southern Nevada Water Project	242	333,114	6		325	18.0	976
Yuma Projects Office	31	29,810					
Totals & Averages	394	494,004	9		365	18.2	739
REGION 4							
Central Utah Project	262	349,664	9	1	6,379	25.7	18,243
CRSP Montrose (Power Operations)	18	7,152					
Curecanti Unit	183	173,673	3		134	17.3	772
Durango Projects Office		3,073					
Grand Junction Projects Office	3	524					
Lyman Project	131	126,565					
Upper Green River		4,651					
Weber Basin Project	34	16,552					
Totals & Averages	631	681,854	12	1	6,513	17.6	9,552
REGION 5							
Amarillo Regional Office		3,150					
Canadian River Project		7,621					
Navajo Project	74	74,977					
Pecos River Project	17	27,546					
Rio Grande Project	14	1,562					
San Juan-Chama Project	514	824,866	8		417	9.7	506
Totals & Averages	619	939,722	8		417	8.5	444
REGION 6							
Missouri-Oahe Projects	319	351,059	2		8	5.7	23
Missouri-Souris Projects	147	79,303	2		28	25.2	351
Riverton Project	11	7,693					
Upper Missouri Projects	21	49,591					
Yellowtail Construction Office		30,478	1		15	32.8	492
Totals & Averages	498	518,124	5		51	9.7	98
REGION 7							
Fryingpan-Arkansas Project	223	210,316	9		136	42.8	647
Glen Elder Construction Office	41	50,625	1		26	19.8	514
Kansas River Projects	13	25,109					
North Platte River Projects	18	26,764					
South Platte River Projects	4	5,060					
Totals & Averages	299	317,874	10		162	31.5	510
CONSOLIDATED TOTALS							
	3,820	4,792,572	59	2	14,086	12.3	2,939
TOTALS LAST YEAR (1961)							
	3,755	7,567,076	92	6	38,513	12.2	5,090

\* FATALITIES INCLUDED IN TOTAL DISABLING





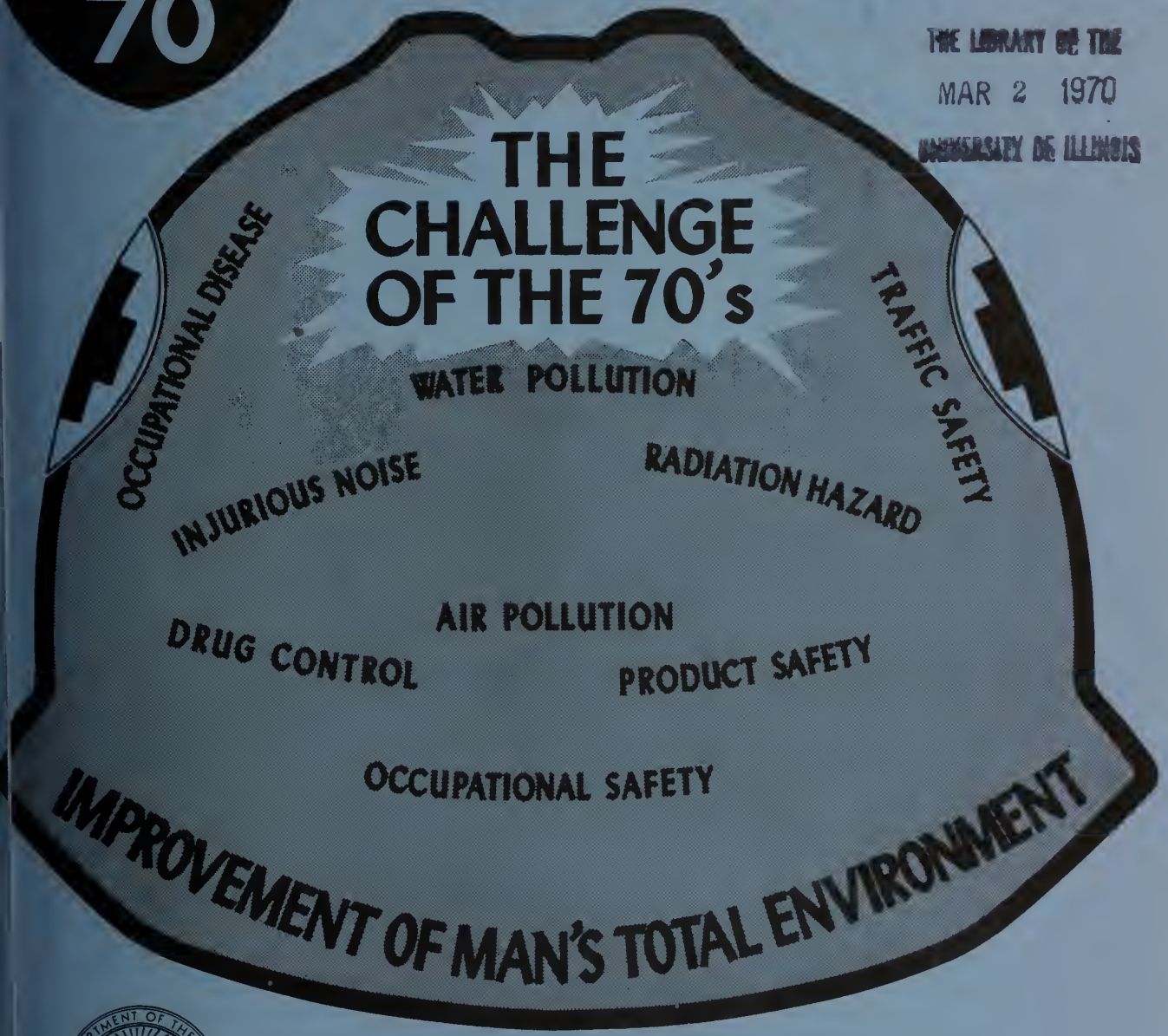


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U.S.  
**MISSION  
SAFETY**  
**70**

# RECLAMATION SAFETY NEWS

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## *Annual Report 1969*

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UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF RECLAMATION  
OFFICE OF CHIEF ENGINEER

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SAFETY NEWS is published quarterly by the Office of  
Chief Engineer, Bureau of Reclamation,  
Denver, Colorado, in the interest of  
accident prevention.

## SAFETY POLICY FOR THE FEDERAL GOVERNMENT

President Nixon recently issued the following policy statement as a memorandum to the heads of executive departments and agencies:

The human suffering and economic waste caused by accidents are principal concerns of this Administration. Federal, civil, and military personnel and the public must be protected; governmental programs must be efficiently run. These two goals can best be realized by a unified, dedicated, and on-going program of accident elimination in government.

We are making progress in this area. In 1965, when Mission SAFETY-70 was begun, the disabling injury frequency rate was 7.7. The rate for 1968 was 6.9 - a three per cent improvement. Through this effort an estimated \$12,210,000 was saved, and 16,200 disabling injuries were prevented.

There is still great progress to be made. Department or agency heads play a major role in the elimination of accidents. If a department or agency has an effective program in this area, it should be continued; if it does not have an adequate program, one should be developed; if the program needs the necessary resources to make it effective, resources should be provided. Everyone in the department or agency should know that a safety program is effective only to the degree that it is supported and participated in by employees.

In a united effort, the federal government will work with labor unions representing government employees, with state and local governments, and with appropriate safety organizations in developing and applying sound accident prevention principles and practices.

The Secretary of Labor is directed to advise me annually, and at such other times as he deems appropriate, of the actions taken and the progress made by each agency.



# BUREAU SAFETY PERFORMANCE

## 1969 CUMULATIVE SAFETY RECORD

January 1 - December 31, 1969

### A. GOVERNMENT FORCES

<u>Region</u>	<u>Injury index*</u>	<u>Frequency rate</u>	<u>Severity rate</u>	<u>Vehicle accident rate</u>
Region 6	0.04	0.6	6	3.2
Region 2	0.2	1.3	12	2.5
Region 5	1.1	1.9	57	3.0
Region 3	1.5	1.2	123	2.5
Region 4	1.5	2.8	55	2.6
Region 1	4.9	3.5	139	5.3
Region 7	<u>104.1</u>	<u>1.6</u>	<u>6,508</u>	<u>2.4</u>
Totals	10.7	1.6	671	3.1

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Totals 1968	0.4	1.1	33	2.6
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\*Injury index is equal to frequency rate times severity rate divided by 100.

### B. CONTRACTOR FORCES

<u>Region</u>	<u>Injury index</u>	<u>Frequency rate</u>	<u>Severity rate</u>	<u>Fatal injuries</u>
Region 6	4.4	6.5	67	0
Region 2	7.5	8.7	86	0
Region 5	37.3	9.3	401	0
Region 7	82.7	22.6	366	0
Region 3	103.0	16.4	628	0
Region 4	997.0	13.6	7,331	1
Region 1	<u>1,108.2</u>	<u>10.7</u>	<u>10,357</u>	<u>2</u>
Totals	366.4	11.4	3,214	3

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Totals 1968	621.0	12.2	5,090	6
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### BUREAU CONTRACTORS' 3-YEAR AVERAGE (1967-1969)

Frequency rate	13.2
Severity rate	3,904

### C. RECLAMATION CIVILIAN CONSERVATION CENTERS

Frequency rate	1.7
Severity rate	15
Vehicle accident rate	21.4

# TREND and OUTLOOK

## THE 1960'S - DECADE OF PROGRESS

GOVERNMENT FORCES - If the past is prologue, Reclamation can face the challenge of the 1970's with confidence. In reviewing the improvement made in the Bureau-wide safety record during the past decade, it is crystal clear that the 1960's was an era of progress and accomplishment - in fact of spectacular accomplishment.

In 1961, plagued by an unsatisfactory safety record, we applied ourselves to overhauling the Bureau's health and safety program. In reorganizing the Bureau's safety program, a policy or management concept was established which intimately involved every supervisor in an active concern for the safety of his employees, contractor employees, and the public. Regional Directors were assigned responsibility for effective administration of the health and safety program on all operations within their respective jurisdictions. In turn, each operating office head was delegated the responsibility for effectively carrying out the safety program and for assuring full compliance with prescribed health and safety standards. As a result, safety is now considered an inseparable operation of management as well as a way of life in Reclamation.

The results were truly spectacular. Prior to 1960, Bureau employees were suffering over 200 disabling injuries each year and the accident frequency rate exceeded 10.0 accidents per million man-hours worked. Following the overhaul of the safety program in 1961, there has been a steady and continuing improvement in the record. Since 1963 the Bureau's disabling accident frequency rate has not exceeded 5.0. During each of the past 4 years, fewer than 60 Bureau employees have suffered disabling injuries. In 1968 and 1969 the accident frequency rate reached an all-time low of 1.1 and 1.6, respectively. This exemplary record compares with the current Federal Government accident frequency rate of 6.9.

MISSION SAFETY-70 - Reclamation was one of the few Federal agencies to achieve a 30 percent reduction in its accident frequency rate by 1970, which was the goal of Mission SAFETY-70. The current accident frequency rate of 1.6 represents a 43 percent reduction compared with the Bureau rate of 2.8 in 1965 when Mission SAFETY-70 was begun.

CONTRACTOR FORCES - During the past decade, contractors working for Reclamation have enjoyed comparatively good safety records. Prior to 1960 the annual contractor accident frequency rate exceeded 25 disabling injuries per million man-hours worked. Since 1962 the contractor accident frequency rate has been below 16.0. In 1969 the contractor accident frequency rate was 11.4, the lowest in Reclamation's history. Over the past 10 years the contractor accident frequency rate has shown steady improvement and has been consistently less than one-half the industry-wide rate for heavy construction. A corresponding improvement has been made in the contractor fatality rate.

OVERALL ACHIEVEMENT - During the 1960's, Reclamation maintained an exemplary vehicle accident record which is reflected in reduced vehicle accident costs. Also, with few exceptions, our losses from fire and property damage were minimal. Under the "Operation Westwide" program, our efforts to safeguard the public on Reclamation facilities, lakes and reservoirs continued to be rewarding.

Today Reclamation has one of the best safety records in Government. In recognition of this achievement in safety, the Bureau has been awarded the Nation's most coveted safety award in 5 of the past 6 years: The National Safety Council's AWARD OF HONOR.

As a result of the safety record achieved during the 1960's, our accident costs were reduced significantly, optimum use of manpower was achieved, and the public was able to enjoy our recreational areas with safety. These past accomplishments have resulted in very real and tangible benefits to the Bureau of Reclamation, the Department, and the Nation.

### THE 1970'S - DECADE OF CHALLENGE

President Richard Nixon and the Administration have pledged that the solution of man's environmental problems will be a major goal of the 1970's. As a result, Reclamation activities, particularly the conservation and development of water and land resources, must be evaluated in terms of their influence on man's total environment. While we have not neglected these considerations in the past, greater emphasis will be placed on the solution of man's health and environmental problems.

This change in emphasis is considered timely since we are convinced that we have about reached the saturation point in attempting

to improve the Bureau's safety record through mechanical safeguards and personal protective equipment. Also, we believe our current health and safety standards, particularly those covering construction, have kept pace with the art. Consequently, it is time that we devote more time and attention to environmental problems such as atmospheric pollutants, toxic materials, radiation, harmful noise, heat debilitation, and sanitation. We must broaden our physical fitness program to provide periodic physical examinations for all employees - Bureau and contractor - who are engaged in hazardous work or in jobs where ill health or physical limitations could endanger themselves or others. Also, as good as our vehicle accident record has been, we must do more to assist in finding the solution to a problem that claimed the lives of 475,000 men, women and children during the 1960's.

**SAFETY EDUCATION** - In reviewing occupational injury statistics, including our own, it is evident that the principal cause of occupational accidents today - about 85 percent - has been due to our inability to fully cope with the human element. As a result, today's accidents and disabling injuries usually result from unauthorized shortcuts, mismanagement, lack of information, momentary inattention, failure to follow standard procedures and to observe safety requirements. It should be pointed out that this is not basically the fault of the injured employee, but that the fault lies with the failure of management and labor to provide effective safety education and training.

While Reclamation has pursued an aggressive safety education and training program, the program has been keyed largely to the training of Bureau personnel. In order to improve the Bureau's contractor safety record, greater emphasis must be placed on safety education and training for contractor personnel. A safety training program that reaches every construction supervisor and influences every worker is needed. Reclamation is preparing to meet this challenge in the 1970's.

**CONSTRUCTION SAFETY** - We are presently making plans to revise the Bureau's construction safety program to include provision for training contractor supervisors in the fundamentals of health and safety. Under the plan, each Bureau construction contract will stipulate that construction foremen employed on Bureau contracts must complete a 12-hour course of instruction in construction safety. The instruction will follow the basic lecture outline as set forth in the Associated General Contractors'



Safety Training Course for Construction Supervisors, using "Construction Safety Standards," published by Reclamation, as the text. The course will consist of six or seven basic lectures closely related to Bureau construction activities.

This is a new and somewhat novel approach by a Federal agency to cope with the poor safety record in construction. However, in taking the initiative we are sure it is absolutely necessary to fill the void that exists today in the construction safety effort. It is hoped it will be an interim measure and eventually will be replaced by equally effective safety education programs conducted industry wide by labor and management.

**NOISE CONTROL** - As part of our continuing effort to provide a safe and healthful environment for Bureau employees and the public, we recently initiated a Bureau-wide hearing conservation and noise control program. Initially sound technicians were trained and assigned to survey and assess noise conditions in all regions. We are now providing technical training in noise control techniques for Bureau design engineers. The purpose of this training is to teach noise control techniques to a large segment of our design engineers in order that injurious noise can be eliminated in the design stage.

**BUREAU SAFETY TRAINING** - In addition to safety training sponsored on a Bureau-wide basis, such as construction safety, driver improvement, first aid, etc., we will continue to initiate and carry out health and safety training applicable to specific operations or activities. As an example, training is currently being conducted at power operation and maintenance facilities for the purpose of training and certifying linemen to safely perform maintenance work on the Bureau's high-voltage transmission system.

**PUBLIC SAFETY** - In spite of our efforts to reduce the hazard along Bureau canals and waterways, people continue to drown in these facilities. During the 5-year period from 1964 through 1968, over 150 public drownings occurred in Bureau-constructed canals and laterals. It is evident that the Bureau, in cooperation with the irrigation districts and the communities effected, must find an effective solution to these tragic drownings.

Last year we undertook an extensive study of hazards to people and animals from Bureau-constructed canals. A thorough review

was made of the nature and cause of the drownings which occurred during the past 5 years. Preventive measures were thoroughly considered and evaluated from the standpoint of effectiveness, practicability and economy. From this study, preventive measures relating to design, maintenance, and public education were evolved which, hopefully, will aid in coping with this environmental problem.

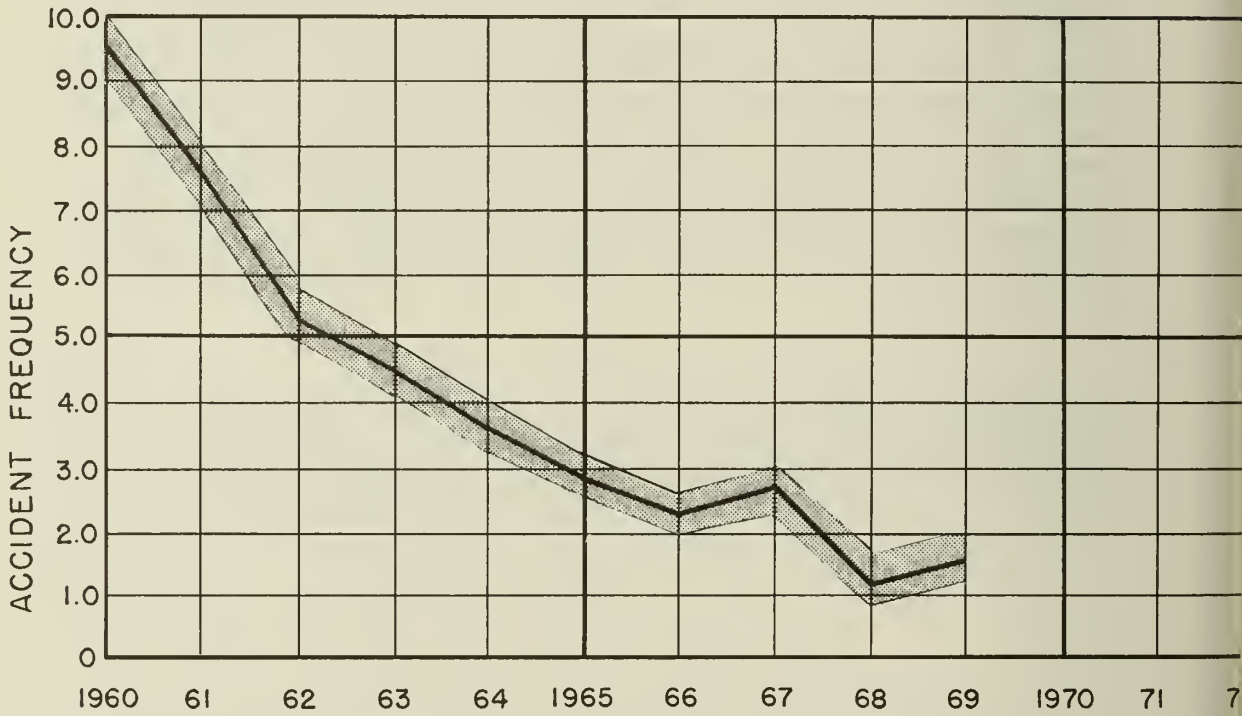
SAFETY OF DAMS - In considering Bureau safety activities from a broader environmental standpoint, considerable importance is attached to the safety of Reclamation dams. Today the Bureau is conducting an intensive program, established to insure the continued safety of more than 230 storage dams on projects throughout the West. This program provides for a thorough in-depth investigation of all Reclamation dams, including consideration of the physical condition of the facility together with a review of operation and maintenance procedures. Included is the surveillance of landslide potentials within reservoir areas, together with a reevaluation of spillway capacities of dams which were designed before present day hydrologic techniques were developed. Remedial measures are taken when inadequacies are found which effect the safety of the structures. The safety of dams program continues to improve with the development of new testing methods, and the service is now being utilized by other agencies.

THE ABOVE REPRESENT ONLY A FEW OF THE SAFETY PROGRAMS BEING CARRIED OUT BY THE BUREAU OF RECLAMATION IN ORDER TO IMPROVE MAN'S ENVIRONMENT - TO MEET THE CHALLENGE OF THE 1970'S.

\* \* \* \* \*

## THE RECORD

# GOVERNMENT FORCES



The following accident statistical tabulations indicate areas of strength and weakness and should be helpful in directing our efforts to specific locations, operations, and phases of accident prevention requiring improvement.

## WORK ACTIVITY - BUREAU-WIDE

<u>Type of work</u>	<u>Man-hour exposure</u>	<u>Disabling injuries</u>	<u>Days lost</u>	<u>Frequency rate</u>	<u>Severity rate</u>
Administration	8, 289, 015	4	6, 034	0. 5	728
Construction	2, 897, 160	10	265	3. 5	91
Investigation	2, 207, 072	5	168	2. 3	76
Irrigation O&M	2, 128, 383	3	143	1. 4	67
Power O&M	<u>3, 958, 364</u>	<u>10</u>	<u>6, 456</u>	<u>2. 5</u>	<u>1, 631</u>
1969 Totals	19, 479, 994	32	13, 066	1. 6	671
1968 Totals	20, 635, 325	23	684	1. 1	33

## ORGANIZATIONAL UNIT

### Washington Office

<u>Year</u>	<u>Man-hour exposure</u>	<u>Disabling injuries</u>	<u>Days lost</u>	<u>Frequency rate</u>	<u>Severity rate</u>
1969 Totals	644, 616	0	0	0. 0	0
1968 Totals	628, 560	0	0	0. 0	0

### Denver Office

1969 Totals	2, 761, 476	2	4	0. 7	1
1968 Totals	2, 841, 280	1	11	0. 4	4

### Region 1

<u>Major activity</u>	<u>Man-hour exposure</u>	<u>Disabling injuries</u>	<u>Days lost</u>	<u>Frequency rate</u>	<u>Severity rate</u>
Administration	615, 940	0	0	0. 0	0
Construction	538, 917	5	104	9. 3	193
Investigation	404, 615	0	0	0. 0	0
Irrigation O&M	384, 456	2	66	5. 2	172
Power O&M	<u>903, 841</u>	<u>3</u>	<u>227</u>	<u>3. 3</u>	<u>251</u>
1969 Totals	2, 847, 769	10	397	3. 5	139
1968 Totals	3, 402, 990	6	219	1. 8	64



Region 2

Major activity	Man-hour exposure	Disabling injuries	Days lost	Frequency rate	Severity rate
Administration	1, 126, 803	0	0	0.0	0
Construction	627, 988	1	6	1.6	10
Investigation	744, 520	1	16	1.3	21
Irrigation O&M	637, 517	0	0	0.0	0
Power O&M	<u>642, 961</u>	<u>3</u>	<u>23</u>	<u>4.7</u>	<u>36</u>
1969 Totals	3, 779, 789	5	45	1.3	12
1968 Totals	3, 957, 838	5	179	1.3	45

Region 3

Administration	754, 068	1	30	1.3	40
Construction	555, 144	1	135	1.8	243
Investigation	178, 937	1	135	5.6	754
Irrigation O&M	120, 960	0	0	0.0	0
Power O&M	<u>832, 518</u>	<u>0</u>	<u>0</u>	<u>0.0</u>	<u>0</u>
1969 Totals	2, 441, 627	3	300	1.2	123
1968 Totals	2, 422, 284	2	173	0.8	71

Region 4

Administration	714, 965	0	0	0.0	0
Construction	308, 486	1	5	3.2	16
Investigation	241, 387	2	7	8.3	29
Irrigation O&M	54, 876	0	0	0.0	0
Power O&M	<u>447, 381</u>	<u>2</u>	<u>86</u>	<u>4.5</u>	<u>192</u>
1969 Totals	1, 767, 095	5	98	2.8	55
1968 Totals	1, 956, 173	3	50	1.5	26

Region 5

<u>Major activity</u>	<u>Man-hour exposure</u>	<u>Disabling injuries</u>	<u>Days lost</u>	<u>Frequency rate</u>	<u>Severity rate</u>
Administration	354, 975	0	0	0.0	0
Construction	284, 202	2	15	7.0	53
Investigation	196, 622	0	0	0.0	0
Irrigation O&M	693, 055	1	77	1.4	111
Power O&M	<u>89, 523</u>	<u>0</u>	<u>0</u>	<u>0.0</u>	<u>0</u>
1969 Totals	1, 618, 377	3	92	1.9	57
1968 Totals	1, 688, 294	2	24	1.2	14

Region 6

Administration	657, 524	0	0	0.0	0
Construction	252, 187	0	0	0.0	0
Investigation	272, 519	1	10	3.7	37
Irrigation O&M	122, 103	0	0	0.0	0
Power O&M	<u>452, 496</u>	<u>0</u>	<u>0</u>	<u>0.0</u>	<u>0</u>
1969 Totals	1, 756, 829	1	10	0.6	6
1968 Totals	1, 680, 185	1	6	0.6	4

Region 7

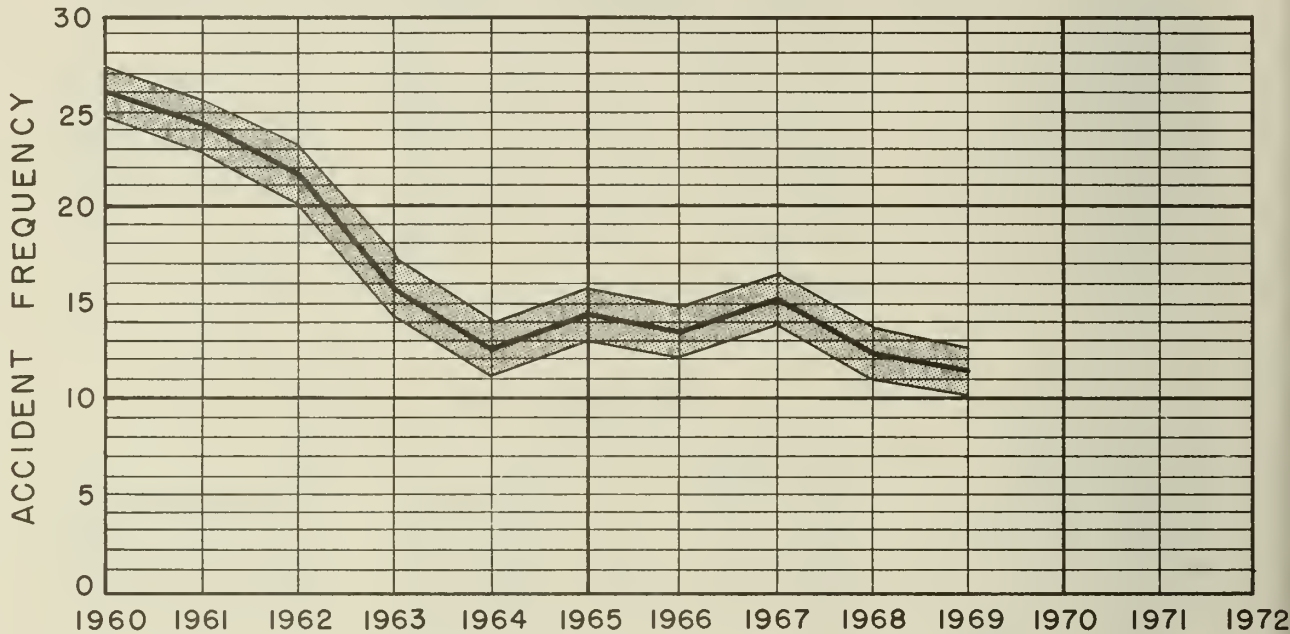
Administration	658, 648	1	6, 000	1.5	9, 110
Construction	330, 236	0	0	0.0	0
Investigation	168, 472	0	0	0.0	0
Irrigation O&M	115, 416	0	0	0.0	0
Power O&M	<u>589, 644</u>	<u>2</u>	<u>6, 120</u>	<u>3.4</u>	<u>10, 379</u>
1969 Totals	1, 862, 416	3	12, 120	1.6	6, 508
1968 Totals	2, 057, 721	3	22	1.5	11

FATAL ACCIDENTS - BUREAU EMPLOYEES

Two Region 7 employees were fatally injured in a helicopter crash on March 3, 1969, while patrolling the Seminole-Cheyenne 115-kv Transmission Line.

\* \* \* \* \*

# CONTRACTOR FORCES



## THE RECORD

### WORK ACTIVITY - CONTRACTOR FORCES

<u>Type of work</u>	<u>Man-hour exposure</u>	<u>Disabling injuries</u>	<u>Days lost</u>	<u>Frequency rate</u>	<u>Severity rate</u>
Canals	961, 544	10	6, 253	10.4	6, 503
Concrete dams	486, 812	6	382	12.3	785
Earth dams	927, 584	12	428	12.9	461
Tunnels	1, 525, 384	28	6, 949	18.4	4, 556
*Power facilities	1, 416, 851	10	6, 167	7.1	4, 353
Miscellaneous	980, 472	6	71	6.1	72
1969 Totals	6, 298, 647	72	20, 250	11.4	3, 214
1968 Totals	7, 567, 076	92	38, 513	12.2	5, 090

\*Covers transmission lines and substations.

## ORGANIZATIONAL UNIT

### Region 1

<u>Major activity</u>	<u>Man-hour exposure</u>	<u>Disabling injuries</u>	<u>Days lost</u>	<u>Frequency rate</u>	<u>Severity rate</u>
Canals	192, 167	4	6, 184	20. 8	32, 180
Concrete dams	328, 909	4	277	12. 2	842
Earth dams	3, 341	0	0	0. 0	0
Power facilities	629, 273	5	6, 112	7. 9	9, 712
Miscellaneous	<u>60, 269</u>	<u>0</u>	<u>0</u>	<u>0. 0</u>	<u>0</u>
1969 Totals	1, 213, 959	13	12, 573	10. 7	10, 357
1968 Totals	1, 511, 617	22	6, 884	14. 6	4, 554

### Region 2

Canals	482, 819	5	54	10. 4	112
Earth dams	126, 768	1	5	7. 9	39
Tunnels	59, 690	0	0	0. 0	0
Power facilities	2, 410	0	0	0. 0	0
Miscellaneous	<u>473, 382</u>	<u>4</u>	<u>39</u>	<u>8. 4</u>	<u>82</u>
1969 Totals	1, 145, 069	10	98	8. 7	86
1968 Totals	1, 149, 078	6	419	5. 2	365

### Region 3

Canals	76, 506	0	0	0. 0	0
Tunnels	255, 927	8	380	31. 3	1, 485
Power facilities	100, 266	2	34	19. 9	339
Miscellaneous	<u>235, 695</u>	<u>1</u>	<u>6</u>	<u>4. 2</u>	<u>25</u>
1969 Totals	668, 394	11	420	16. 4	628
1968 Totals	375, 891	1	60	2. 7	160



Region 4

<u>Major activity</u>	<u>Man-hour exposure</u>	<u>Disabling injuries</u>	<u>Days lost</u>	<u>Frequency rate</u>	<u>Severity rate</u>
Canals	10, 933	0	0	0.0	0
Concrete dams	143, 088	1	90	7.0	629
Earth dams	449, 079	7	178	15.6	396
Tunnels	234, 042	4	6, 204	17.1	26, 508
Power facilities	2, 163	0	0	0.0	0
Miscellaneous	<u>43, 572</u>	<u>0</u>	<u>0</u>	<u>0.0</u>	<u>0</u>
1969 Totals	882, 877	12	6, 472	13.6	7, 331
1968 Totals	848, 656	7	143	8.2	169

Region 5

Canals	134, 974	0	0	0.0	0
Earth dams	306, 420	4	245	13.1	800
Tunnels	686, 418	7	229	10.2	334
Miscellaneous	<u>53, 020</u>	<u>0</u>	<u>0</u>	<u>0.0</u>	<u>0</u>
1969 Totals	1, 180, 832	11	474	9.3	401
1968 Totals	1, 783, 691	24	12, 571	13.5	7, 048

Region 6

Canals	38, 690	1	15	25.8	388
Concrete dams	14, 815	1	15	67.5	1, 012
Earth dams	33, 067	0	0	0.0	0
Power facilities	656, 754	3	21	4.6	32
Miscellaneous	<u>21, 712</u>	<u>0</u>	<u>0</u>	<u>0.0</u>	<u>0</u>
1969 Totals	765, 038	5	51	6.5	67
1968 Totals	533, 082	5	78	9.4	146

### Region 7

<u>Major activity</u>	<u>Man-hour exposure</u>	<u>Disabling injuries</u>	<u>Days lost</u>	<u>Frequency rate</u>	<u>Severity rate</u>
Canals	25,455	0	0	0.0	0
Earth dams	8,909	0	0	0.0	0
Tunnels	289,307	9	136	31.1	470
Power facilities	25,985	0	0	0.0	0
Miscellaneous	<u>92,822</u>	<u>1</u>	<u>26</u>	<u>10.8</u>	<u>280</u>
1969 Totals	442,478	10	162	22.6	366
1968 Totals	1,365,061	27	18,358	19.8	13,448

\* \* \* \* \*

### TREADWEAR INDICATORS

All passenger tires manufactured for sale in the United States are now required to have treadwear indicators. The indicators appear as continuous bars across the tread when the tread pattern has been worn to a remaining depth of 1/16 of an inch.

\* \* \* \* \*

### ARGUMENT FOR SAFETY BELTS

According to Warren C. Nelson, Ohio Highway Safety Director, 702 "un-safetybelted" motorists are known to have died in Ohio weekend traffic accidents last year. The belt status of another 191 crash victims was unreported. Only 28 safety belt wearers, about 3 percent, were among the 921 motorists killed during the 52 weekends.

# RECLAMATION JOB CORPS CIVILIAN CONSERVATION CENTERS

## 1969 CUMULATIVE ACCIDENT RECORD

<u>Region</u>	<u>Man-hours exposure</u>	<u>Disabling injuries</u>	<u>Days lost</u>	<u>Frequency rate</u>	<u>Severity rate</u>
Region 1	2, 490, 096	5	66	2. 0	27
Region 2*	465, 612	3	18	6. 4	39
Region 4	2, 091, 432	1	3	0. 5	1
Region 5*	340, 098	1	2	2. 9	6
Region 7*	<u>413, 504</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>
Totals	5, 800, 742	10	89	1. 7	15
1968 Totals	7, 331, 008	19	18, 255	2. 6	2, 490

\*Reclamation Job Corps Civilian Conservation Centers in Regions 2, 5 and 7 were deactivated during 1969.

## VEHICLE ACCIDENT EXPERIENCE

<u>Region</u>	<u>No. of accidents</u>	<u>Mileage</u>	<u>Accident rate</u>	<u>Estimated damage</u> <u>Government</u>	<u>Private</u>
Region 1	15	573, 590	26. 1	\$2, 330	\$1, 901
Region 2	2	100, 920	19. 8	-	118
Region 4	4	368, 093	10. 9	1, 229	320
Region 5	2	52, 879	37. 8	1, 095	-
Region 7	<u>2</u>	<u>74, 308</u>	<u>26. 9</u>	<u>1, 350</u>	<u>-</u>
Totals	25	1, 169, 790	21. 4	\$6, 004	\$2, 339
1968 Totals	28	1, 775, 322	15. 8	\$4, 969	N/A

Vehicle accidents involving Job Corps staff: 6  
 Vehicle accidents involving VISTA workers: -  
 Vehicle accidents involving corpsmen: 19

THE COLLBRAN JOB CORPS CIVILIAN CONSERVATION CENTER, COLLBRAN, COLORADO ESTABLISHED AN EXEMPLARY SAFETY RECORD DURING 1969 BY COMPLETING THE YEAR WITHOUT A VEHICLE ACCIDENT OR A DISABLING INJURY.

\* \* \* \* \*

# VEHICLE ACCIDENTS

THE FOLLOWING TABLE SHOWS BUREAU VEHICLE  
ACCIDENT EXPERIENCE SINCE 1960:

<u>Year</u>	<u>No. of accidents</u>	<u>Accident rate*</u>	<u>Estimated damage</u>
1969	102	3.1	\$24,388
1968	97	2.6	13,313
1967	117	3.1	32,582
1966	125	3.1	26,771
1965	116	2.9	23,205
1964	114	2.8	36,410
1963	134	3.4	25,130
1962	125	3.4	33,100
1961	151	4.6	41,255
1960	75	2.7	32,960

\*Number of accidents per million miles driven.

THE FOLLOWING TABLE COMPARES THE VEHICLE ACCIDENT  
EXPERIENCE OF MAJOR ORGANIZATIONAL UNITS  
OF RECLAMATION FOR CALENDAR YEAR 1969:

<u>Region</u>	<u>No. of accidents</u>	<u>Mileage</u>	<u>Accident rate*</u>	<u>Estimated damage</u>
Denver Office	3	429,271	7.0	\$ 266
Region 1	20	3,760,016	5.3	3,939
Region 2	20	7,880,957	2.5	4,932
Region 3	11	4,354,401	2.5	2,760
Region 4	9	3,441,541	2.6	2,190
Region 5	14	4,638,972	3.0	4,050
Region 6	15	4,746,332	3.2	2,174
Region 7	10	4,096,125	2.4	4,077
Totals	102	33,347,615	3.1	\$24,388
1968 Totals	97	37,475,611	2.6	\$13,313

\*Number of accidents per million miles driven.

Note: Estimated damage covers only the cost of repair or replacement of the Government vehicle involved. It is estimated that over \$5,000 of the \$24,388 estimated damage in 1969 will be recovered by the Government.

\* \* \* \* \*



# ACCIDENT COSTS

Accidents do not always involve personal injury to employees but may result in the destruction or loss of property and third-party claims. Consideration and review of costs resulting from accidents is essential to the appraisal of any accident prevention program. The following summary of estimated accident costs for calendar years 1969, 1968, 1967, and 1966 is presented for this purpose.

<u>Type of accident</u>	<u>1969</u>	<u>Estimated cost</u>		<u>1966</u>
		<u>1968</u>	<u>1967</u>	
Work injuries <sup>1/</sup>				
Disabling injuries	\$ 39,480	\$ 29,463	\$ 39,490	\$ 33,000
Nondisabling injuries	26,580	8,320	8,464	7,920
Fatal injuries	153,388	69,931	124,144	57,038
Fires	30,700	350	8,362	55,261
Tort claims <sup>2/</sup>	22,123	361,727	148,327	27,027
Employee claims	423	12	-	207
Motor vehicle accidents	24,388	13,313	32,582	26,771
Other property damage	<u>122,066</u>	<u>20,410</u>	<u>6,024</u>	<u>2,232</u>
Totals	\$419,148	\$503,526	\$367,393	\$209,456

<sup>1/</sup>Cost estimate based on past 5-year average cost.

<sup>2/</sup>Tort claims resulting from accidents adjudicated during 1966, 1967, 1968, and 1969.

The costs shown are estimated direct costs resulting from accidents.

STUDIES CONDUCTED BY COMPETENT AND  
RECOGNIZED AUTHORITIES INDICATE THAT  
INDIRECT ACCIDENT COSTS EXCEED DIRECT  
ACCIDENT COSTS BY A RATIO OF 4:1

\* \* \* \* \*

# PUBLIC SAFETY

## RECORD OF PUBLIC DROWNINGS

<u>Bureau-operated Facilities:</u>	<u>CY69</u>	<u>CY68</u>	<u>CY67</u>
Dams	2	0	0
Canals	27	24	15
Reservoirs	<u>2</u>	<u>4</u>	<u>4</u>
Total	31	28	19

### Facilities Operated by Others:

Irrigation and Water Districts	34	13	13
State or County (Recreational)	<u>35</u>	<u>56</u>	<u>37</u>
Total	69	69	50

### Summary of Total Drownings During Period:

#### By Operating Agency:

Bureau of Reclamation	31	28	19
Irrigation and Water Districts	34	13	13
State or County (Recreational)	<u>35</u>	<u>56</u>	<u>37</u>
Total	100	97	69

#### By Type of Facility:

Dams	4	0	2
Canals	56	39	24
Reservoirs	<u>40</u>	<u>58</u>	<u>43</u>
Total	100	97	69

#### By Activity:

Swimming	28	26	21
Boating	16	21	13
Fishing	6	4	0
Fell into water	18	26	20
Other	<u>32</u>	<u>20</u>	<u>15</u>
Total	100	97	69

#### By Age:

Under 12 years of age	16	22	13
From 12 to 25	39	37	24
From 25 to 50	26	25	22
Over 50 years of age	<u>19</u>	<u>13</u>	<u>10</u>
Total	100	97	69

\* \* \* \* \*

# **SAFETY AWARDS**

## COMMISSIONER'S ANNUAL SAFETY AWARD - 1969

Presented to Region 6, Billings, Montana, in recognition of the best safety record for Government forces during calendar year 1969.

## NATIONAL SAFETY COUNCIL AWARDS

### AWARD OF HONOR (1968)

Bureau of Reclamation - Bureau-wide  
Region 1 - Boise, Idaho  
Region 2 - Sacramento, California  
Region 3 - Boulder City, Nevada  
Region 5 - Amarillo, Texas  
Region 6 - Billings, Montana  
Region 7 - Denver, Colorado

### AWARD OF MERIT (1968)

Region 4 - Salt Lake City, Utah

## NATIONAL FLEET SAFETY CONTEST (1968-1969)

Region 2, Sacramento, California - First Place - Government Fleet Division, City Truck Group 1.

Region 7, Denver, Colorado - First Place - Passenger Car Division, Western Region Groups, Group 1.

## DEPARTMENT OF THE INTERIOR

### ANNUAL MOTOR VEHICLE SAFETY AWARD

The Bureau of Reclamation received the Department of the Interior Annual Motor Vehicle Safety Award for calendar year 1968.

THE DEPARTMENT OF THE INTERIOR'S  
CERTIFICATE OF SAFETY ACHIEVEMENT AWARD - 1969

IN RECOGNITION OF OVER 500, 000 MAN-HOURS WITHOUT A  
DISABLING INJURY:

Albuquerque Development Office - Albuquerque, New Mexico  
Middle Rio Grande Project - Albuquerque, New Mexico  
Navajo Indian Irrigation Project - Farmington, New Mexico  
Red Bluff CVP Construction Office - Red Bluff, California (now  
closed)

IN RECOGNITION OF OVER 1, 000, 000 MAN-HOURS WITHOUT A  
DISABLING INJURY:

Columbia Basin Project - Ephrata, Washington  
Fryingpan-Arkansas Project - Pueblo, Colorado  
Parker-Davis Project - Phoenix, Arizona  
South Platte River Projects - Loveland, Colorado

IN RECOGNITION OF OVER 2, 000, 000 MAN-HOURS WITHOUT A  
DISABLING INJURY:

North Platte River Projects - Casper, Wyoming

IN RECOGNITION OF OVER 500, 000 ACCIDENT-FREE MILES:

Auburn-Folsom South Unit CVP Construction Office -  
Auburn, California  
Fresno Field Division - Fresno, California  
Middle Rio Grande Project - Albuquerque, New Mexico  
Missouri-Souris Projects - Bismarck, North Dakota  
Navajo Indian Irrigation Project - Farmington, New Mexico  
Parker-Davis Project - Phoenix, Arizona  
Red Bluff CVP Construction Office - Red Bluff, California (now  
closed)  
Rio Grande Project - El Paso, Texas  
Sacramento Valley CVP Construction Office - Willows, California  
San Juan-Chama Project - Santa Fe, New Mexico  
Shasta Field Division - Redding, California  
Tracy Field Division - Tracy, California  
Transmission Lines Office - Reno, Nevada (now closed)

IN RECOGNITION OF OVER 1, 000, 000 ACCIDENT-FREE MILES:

Kansas River Projects - McCook, Nebraska



## CONSTRUCTION SAFETY AWARD - 1969

The Construction Safety Award is presented to contractors in recognition of exemplary safety records achieved while performing work for Reclamation. To be eligible, a contractor must have initiated and carried out an effective safety program during the term of his contract. He must have achieved a cumulative accident record lower than the average record obtained by all Bureau contractors during the preceding 3-year period. Equally important, he must have indicated a sincere interest in the safety of his employees by virtue of expending the time and effort necessary to carry out an aggressive and continuing safety effort. The following Bureau contractors earned Construction Safety Awards during 1969:

Abel Construction Company - Lincoln, Nebraska  
Bushman Construction Company - St. Joseph, Missouri  
City Electric, Inc., dba Trans-Pacific Electric, Inc. -  
Menlo Park, California  
Colorado Constructors, Inc., and A. S. Horner Construction  
Company - Denver, Colorado  
Darkenwald Construction Company, Inc. - Sacramento, California  
Emil Anderson Construction Company, Ltd. - Sacramento,  
California  
Equipco Contractors, Inc. - Ephrata, Washington  
Ets-Hokin Corporation - San Francisco, California  
Foley Brothers, Inc., and Winston Brothers Company - St Paul,  
Minnesota  
Gene McLaughlin Construction Company - Fresno, California  
Heide-Christolear, Inc., and Van Pak Construction Company -  
Smith Center, Kansas  
Hood Corporation - Whittier, California  
Huntington Brothers - Napa, California  
Industrial Pipelines Intermountain, Inc. - Murray, Utah  
Lentz Construction Company - Sacramento, California  
Oscar C. Holmes, Inc., and Holmes-Clair, Inc. - Menlo Park,  
California  
Rivers Construction Company, Inc., Wesco Constructors, Inc.,  
and Purtzer and Dutton, Inc. - Tracy, California  
S & Q Construction Company - South San Francisco, California  
Sutherland Construction, Inc. - Auburn, California  
Thomas Construction Company - Fresno, California  
Universal Constructors, Inc. - Albuquerque, New Mexico  
Westinghouse Electric Company - Denver, Colorado

CONSTRUCTION SAFETY AWARD PRESENTED  
TO HOOD CORPORATION



Leon Wilson (left), Project Superintendent for Hood Corporation, is shown accepting the Construction Safety Award from Office Engineer G. G. Drake, acting in behalf of Construction Engineer E. J. Brannan, Fresno CVP Construction Office, Fresno, California. Photo P805-243-2183NA

The Bureau of Reclamation's Construction Safety Award was presented to the Hood Corporation on November 10, 1969, for completing work under Specifications No. DC-6570 - Construction of Laterals 13, 15 and 17, Westlands Water District Distribution System, Central Valley Project, California - without incurring a single disabling injury. The value of this contract was \$4,378,000.

The Hood Corporation was also presented with the Construction Safety Award during 1969 for completing the Boulder City Lateral in Nevada without a single lost-time injury.

# SAFETY PERFORMANCE RECORD

## CUMULATIVE QUARTERLY REPORT

### GOVERNMENT FORCES

4th QUARTER, 1962

PERIOD FROM JANUARY 1, 1962 THROUGH December 31, 1962

REPORTING OFFICE	NUMBER OF EMPLOYEES (AVERAGE)	MAN HOURS	DISABLING INJURIES		DAYS LOST	FREQUENCY RATE	SEVERITY RATE
			CUMULATIVE THIS YEAR	FATAL *		CUMULATIVE THIS YEAR	CUMULATIVE THIS YEAR
Washington Office	302	644,616					
Denver Office	1,317	2,761,476	2		4	0.7	1
REGION 1							
Boise Regional Office	178	289,897	1		19	3.4	66
Central Snake Project	39	74,132	1		47	13.5	634
Chief Joseph Dam	35	76,500					
Columbia Basin Project	654	1,432,266	4		182	2.8	127
Green Springs Powerplant	2	4,033					
Hungry Horse Project	46	80,658					
Lower Columbia Development Office	34	97,536					
Lower Teton	12	17,305					
Minidoka Project	69	144,948	1		114	6.9	786
Snake River Development Office	50	113,525					
Third Powerplant	185	370,574	3		35	8.1	94
Upper Columbia Development Office	48	82,060					
Wild Horse Dam		7,499					
Yakima Project	31	56,836					
Totals & Averages	1,403	2,847,769	10		397	3.5	139
REGION 2							
Sacramento Regional Office	561	1,290,828	2		5	1.5	4
Regional Drill Crew	39	86,738	1		16	11.5	184
Auburn-Folsom South Unit	203	399,688					
Cachuma Operations Field Branch	2	5,200					
Central Coast Dev. Field Branch	4	7,392					
Folsom Field Division	74	154,416					
Freano CVP Construction Office	132	263,121	1		6	3.8	23
Fresno Field Division	150	283,112					
Klamath Project Office	17	38,605					
Lahontan Basin Projects Office	41	107,168					
Napa Development Field Branch	2	5,376					
Sacramento Valley CVP Const. Office	116	236,783					
San Luis Unit CVP Const. Office	79	255,146					
Shasta Field Division	139	297,549	1		18	3.4	60
Solano Operations Field Branch	3	6,040					
Tracy Field Division	161	332,331					
Upper North Coast Dev. Field Branch	3	7,296					
Totals & Averages	1,726	3,779,789	5		45	1.3	12
REGION 3							
Boulder City Regional Office	199	383,980					
Boulder Canyon Project	139	302,575					
Dixie Project Office	5	9,747					
Lower Colorado River Project	204	378,841	1		135	2.6	356
Mead Construction Office		32,899					
Parker-Davis Project	334	695,559	1		30	1.4	43
Phoenix Development Office	93	179,360	1		135	5.5	752
Southern California Dev. Office	20	37,367					
Southern Nevada Water Project	81	158,457					
Transmission Lines Office		8,760					
Yuma Projects Office	133	254,082					
Totals & Averages	1,208	2,441,627	3		300	1.2	123
REGION 4							
Salt Lake City Regional Office	201	449,724	1		5	2.2	11
Central Utah Project	167	356,822					
CRSP Power Operations Office	268	525,325	2		86	3.8	164
Curecanti Unit	67	156,261	1		5	6.4	32
Durango	25	50,117					
Grand Junction	47	98,572	1		2	10.1	20
Logan Development Office	5	14,600					
Lyman Project	24	51,125					
Upper Green River Dev. Office	21	45,276					
Weber Basin Project		19,273					
Totals & Averages	825	1,767,095	5		98	2.8	55
REGION 5							
Amarillo Regional Office	97	204,145					
Albuquerque Development Office	33	67,447					
Austin Development Office	44	94,108					
Canadian River Project		838					
Lower Rio Grande Project	1	2,728					
Middle Rio Grande Project	228	456,847	1		77	2.2	169
Navajo Project	73	154,665	1		5	6.5	32
Oklahoma City Development Office	20	35,067					
Pecos River Project	14	22,116					
Rio Grande Project	201	420,554					
San Juan-Chama Project	67	159,862	1		10	6.3	63
Totals & Averages	778	1,618,377	3		92	1.9	57
CONSOLIDATED TOTALS							
TOTALS LAST YEAR (19 )							

\*FATALITIES INCLUDED IN TOTAL DISABLING



# SAFETY PERFORMANCE RECORD

CUMULATIVE QUARTERLY REPORT  
GOVERNMENT FORCES

4th QUARTER, 1969.

PERIOD FROM JANUARY 1, 1969\_\_ THROUGH December 31, 1969\_\_

[illegible]

## JOB CORPS CONSERVATION CENTERS

Columbia Basin Job Corps Center							
Staff	59	233,104	1		1	4.3	4
Corpsmen	200	1,130,016	1		3	0.9	3
Marsing Job Corps Center							
Staff	51	217,456	1		1	4.6	5
Corpsmen	166	909,520	2		61	2.2	67
Lewiston Job Corps Center							
Staff (Custodial)	4	8,536					
Toyon Job Corps Center							
Staff (Custodial)	5	126,284					
VISTA		2,152	1		5	464.7	2,323
Corpsmen		328,640	2		13	6.1	40
Collbran Job Corps Center							
Staff	36	73,154					
VISTA	2	12,608					
Corpsmen	108	591,696					
Weber Basin Job Corps Center							
Staff	56	111,616	1		3	9.0	27
VISTA	1	14,792					
Corpsmen	242	1,287,566					
Arhuckle Job Corps Center							
Staff		92,866					
VISTA		5,744					
Corpsmen		241,488	1		2	4.1	8
Casper Job Corps Center							
Staff		118,272					
Corpsmen		295,232					
TOTAL STAFF	211	981,288	3		5	3.1	5
TOTAL VISTA	3	35,296	1		5	28.3	142
TOTAL CORPSMEN	716	4,784,158	6		79	1.3	17
CONSOLIDATED TOTALS	930	5,800,742	10		89	1.7	15
TOTALS LAST YEAR (1964)	1,335	7,331,008	19	3	18,255	2.6	2,490

\*FATALITIES INCLUDED IN TOTAL DISABLING



# SAFETY PERFORMANCE RECORD

## CUMULATIVE QUARTERLY REPORT

### CONTRACTOR FORCES

4th QUARTER, 1969

PERIOD FROM JANUARY 1, 1962... THROUGH December 31, 1969...

REPORTING OFFICE	NUMBER OF EMPLOYEES (AVERAGE)	MAN HOURS	DISABLING INJURIES		DAYS LOST	FREQUENCY RATE	SEVERITY RATE	
		CUMULATIVE THIS YEAR	CUMULATIVE THIS YEAR	FATAL *	CUMULATIVE THIS YEAR	CUMULATIVE THIS YEAR	CUMULATIVE THIS YEAR	
REGION 1								
Chief Joseph Dam	22	47,307	2		27	42.3	521	
Columbia Basin Project	102	190,241	4	1	6,184	21.0	32,506	
Green Springs Powerplant		236						
Hungry Horse Project		99						
Lower Teton	18	16,052						
Minidoka Project	13	7,110						
Third Powerplant	285	941,288	7	1	6,362	7.4	6,759	
Wild Horse Dam		9,584						
Yakima Project		2,022						
Totals & Averages	440	1,213,959	13	2	12,573	10.7	10,357	
REGION 2								
Auburn-Folsom South Unit	89	209,478	2		6	9.5	29	
Folsom Field Division		178						
Fresno CVP Construction Office	196	393,604	7		71	17.8	180	
Fresno Field Division	14	9,584						
Klamath Project Office	4	576						
Lahontan Basin Projects Office	30	126,768						
Sacramento Valley CVP Constr. Office	127	135,849						
San Luis Unit CVP Constr. Office	120	262,822	1		21	3.8	80	
Shasta Field Division		776						
Tracy Field Division	31	5,384						
Totals & Averages	611	1,145,069	10		98	8.7	86	
REGION 3								
Boulder Canyon Project	2	7,854						
Lower Colorado River Project	31	48,779						
Mead Construction Office		25,505	3		40	117.6	1,568	
Parker-Davis Project	52	91,006						
Southern Nevada Water Project	217	448,322	8		380	17.8	848	
Yuma Projects Office	34	46,928						
Totals & Averages	336	668,394	11		420	16.4	628	
REGION 4								
Central Utah	146	436,350	9	1	6,338	20.6	14,525	
CRSP Power Operations Office	4	9,214						
Curecanti Unit	131	253,877	3		134	11.8	528	
Durango		3,073						
Grand Junction		795						
Lyman Project	30	151,595						
Upper Green River		10,977						
Weber Basin Project		16,996						
Totals & Averages	311	882,877	12	1	6,472	13.6	7,331	
REGION 5								
Amarillo Regional Office		3,150						
Canadian River Project		7,621						
Navajo Project		78,509						
Pecos River Project	11	33,412						
Rio Grande Project	23	8,403						
San Juan-Chama Project	373	1,049,737	11		474	10.5	452	
Totals & Averages	407	1,180,832	11		474	9.3	401	
REGION 6								
Missouri-Oahe Projects	290	533,924	2		8	3.7	15	
Missouri-Souris Projects	107	131,143	2		28	15.3	214	
Riverton Project	8	8,827						
Upper Missouri Projects	30	60,666						
Yellowtail Construction Office		30,478	1		15	32.8	492	
Totals & Averages	435	765,038	5		51	6.5	67	
REGION 7								
Fryingpan-Arkansas Project	133	302,612	9		136	29.7	449	
Glen Elder Unit	72	69,907	1		26	14.3	372	
Kansas River Projects	6	28,592						
North Platte River Projects	11	30,809						
South Platte River Projects	2	10,558						
Totals & Averages	224	442,478	10		162	22.6	366	
Average number of contractor employees per month during 1969: 3,264								
CONSOLIDATED TOTALS		2,764	6,298,647	72	3	20,250	11.4	3,214
TOTALS LAST YEAR (1968)		3,755	7,567,076	92	6	38,513	12.2	5,090

\* FATALITIES INCLUDED IN TOTAL DISABLING

GPO 856-615







# *Reclamation* **SAFETY NEWS**

**FIRST QUARTER 1970**

THE LIBRARY OF THE  
MAY 21 1970  
UNIVERSITY OF ILLINOIS  
AT URBANA-CHAMPAIGN

UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF RECLAMATION  
OFFICE OF CHIEF ENGINEER





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Front Cover Photo: Commissioner Ellis L. Armstrong, Bureau of Reclamation, keynote speaker at the 1970 Western States Safety Supervisors Conference, Denver, Colorado (see page 1). Photo Courtesy of Colorado State Patrol. Photo PX-D-66428.

## CONSTRUCTION SAFETY TO RECEIVE GREATER EMPHASIS

Excerpts from Remarks by Ellis L. Armstrong,  
Commissioner of the Bureau of Reclamation, before  
the Western States Safety Supervisors Conference,  
Denver, Colorado - March 11, 1970

We have a huge backlog of projects authorized by the Congress and awaiting construction. There is also a background of national concern with conservation and enhancement of environmental values. The expertise of all of us will be necessary to resolve problems affecting not only environmental considerations of individual health and safety, but also the full scope of ecological and environmental objectives affecting the entire West.

What is the future as it relates especially to you safety engineers and to the construction industry generally? I expect we will see improved environmental conditions for workmen operating heavy construction equipment. There will be more air-conditioned operating cabs on large earthmoving equipment to improve working conditions and resulting efficiency. There will be regular medical checkups for employees engaged in hazardous or especially arduous work.

I foresee the expanded use of rollover protection and emergency braking systems on construction equipment, particularly high-speed earthmoving machinery. Dust control will be improved to protect the health and increase the efficiency of equipment operators.

The Bureau of Reclamation is currently making plans to revise its construction safety program to include provision for training contractor supervisors in the fundamentals of health and safety. Under the plan, each Bureau construction contract will stipulate that construction foremen employed on Bureau contracts must complete a 12-hour course of instruction in construction safety. The instruction will follow the basic lecture outline as set forth in the Associated General Contractors' Safety Training Course for Construction Supervisors, using Construction Safety Standards, published by Reclamation, as the text. The course will consist of six or seven basic lectures closely related to Bureau construction activities.

This is a new and somewhat novel approach by a Federal agency to cope with the poor safety record in construction. However, in taking the initiative we are sure it is absolutely necessary to fill the void that exists today in the construction safety effort. It is hoped it will be an interim measure and eventually will be replaced by equally effective safety education programs conducted industry-wide by labor and management.

# BUREAU SAFETY PERFORMANCE

## 1970 CUMULATIVE ACCIDENT RECORD

January 1 - March 31, 1970

### A. GOVERNMENT FORCES

<u>Region</u>	<u>Injury index*</u>	<u>Frequency rate</u>	<u>Severity rate</u>	<u>Vehicle accident rate</u>
Region 4	0.0	0.0	0	1.6
Region 6	0.0	0.0	0	2.0
Region 2	0.1	1.1	6	0.6
Region 3	0.3	1.6	20	1.7
Region 1	1.8	3.1	58	9.5
Region 5	2.1	2.6	79	1.0
Region 7	<u>2.7</u>	<u>4.5</u>	<u>61</u>	<u>2.7</u>
Totals to Date	0.4	1.5	24	2.3
<hr/>				
Totals 1969	10.7	1.6	671	3.1

\*Injury index is equal to frequency rate times severity rate divided by 100.

### B. CONTRACTOR FORCES

<u>Region</u>	<u>Injury index</u>	<u>Frequency rate</u>	<u>Severity rate</u>	<u>Fatal injuries</u>
Region 2	0.0	0.0	0	0
Region 3	0.0	0.0	0	0
Region 4	0.0	0.0	0	0
Region 5	0.0	0.0	0	0
Region 1	0.3	2.9	12	0
Region 6	13.3	7.3	182	0
Region 7	<u>72.0</u>	<u>45.3</u>	<u>159</u>	<u>0</u>
Totals to Date	1.3	3.8	34	0
<hr/>				
Totals 1969	366.4	11.4	3, 214	3

### C. RECLAMATION CIVILIAN CONSERVATION CENTERS

Frequency rate	0.8
Severity rate	4
Vehicle accident rate	5.2

## LOST TIME ACCIDENT ANALYSIS

Government Forces - 1970  
First Quarter

Cumulative to Date:  
March 31, 1970

### A. ACCIDENT CLASSIFICATION

<u>Description</u>	<u>No.</u>	<u>Days lost</u>
Lifting	2	13
Handling materials and equipment	2	27
Falls of persons	<u>3</u>	<u>72</u>
Total	7	112

### B. OPERATIONAL SUMMARY

<u>Operation</u>	<u>Man-hours</u>	<u>No. of accidents</u>	<u>Days lost</u>	<u>Frequency rate</u>	<u>Severity rate</u>
Administration, Clerical and Design	1, 933, 597	2	20	1.0	10
Construction	613, 285	3	47	4.9	77
Investigation	546, 814	0	0	0.0	0
Power O&M	990, 843	1	15	1.0	15
Irrigation O&M	<u>495, 302</u>	<u>1</u>	<u>30</u>	<u>2.0</u>	<u>61</u>
Totals	4, 579, 841	7	112	1.5	24

\* \* \* \* \*

## NATIONAL SAFETY COUNCIL DATA SHEETS

The National Safety Council has recently published new or revised technical data sheets on the subjects listed below. Copies of these data sheets (by the numbers shown in parentheses) may be obtained from the National Safety Council, 425 N. Michigan Avenue, Chicago, Illinois 60611:

Barricades and Warning Devices for Highway Construction Work  
(239 Revision A)  
Picric Acid (351 Revision A)  
Carbon Monoxide (415 Revision A)  
Automatic Tire Curing Press Operations (625)

\* \* \* \* \*



# SAFETY AWARDS

## NATIONAL SAFETY COUNCIL AWARDS FOR 1969

The Bureau of Reclamation won the National Safety Council's Award of Merit for 1969.

For outstanding safety performance during 1969, the following Regions of the Bureau have received the National Safety Council awards indicated below:

Region 1--Boise, Idaho .....	Award of Merit
Region 2--Sacramento, California.....	Award of Honor
Region 3--Boulder City, Nevada .....	Award of Honor
Region 5--Amarillo, Texas.....	Award of Merit
Region 6--Billings, Montana.....	Award of Honor

## 111 YEARS OF SAFE DRIVING



Regional Safety Engineer Frank J. Kouba, Region 3, Boulder City, Nevada, is shown presenting Marion Everhart with the National Safety Council's Safe Driver Award for his 23rd year of safe driving. Photo PX-D-66429. Also receiving Safe Driver Awards are E. E. Hertzog, 12 year award; Richard Groesbeck, 1-year award; Leonard Stubbs, 5-year award; James Murchison, 13-year award; Howard Carver, 10-year award; Walter Nicks, 14-year award; George Graupensperger, 5-year award; Curtis Groom, 13-year award, and Bobby Bond, 6-year award.

The National Safety Council's Safe Driver Award is presented to a Bureau driver under the Bureau of Reclamation Safe Driver Award Program and is the highest award for safe driving performance. The award is based on the concept of defensive driving--the ability to avoid accidents in spite of the wrong actions of the other driver and in spite of adverse driving conditions.

## BLOTE SAFETY AWARD DINNER

SACRAMENTO, CALIFORNIA

JANUARY 23, 1970



Assistant Regional Director E. F. Sullivan is shown above (left) presenting to Mr. R. E. Evans, Chief, Tracy Field Division, a letter from Regional Director Robert J. Pafford, Jr., congratulating the Tracy Field Division for an error-free performance during calendar year 1969 in their power operations. Photo PX-D-66430.

Chief of Operations J. R. Hammond (below, right) presenting to Mr. E. M. Axtell, Chief, Folsom Field Division, the Regional Director's Power Operation Award of Merit earned by having the minimum employee errors in Region 2 for calendar year 1969. Photo PX-D-66431.



Mr. R. G. Howard, Regional Supervisor of Water and Land Use, Region 2, (as shown below, left) has just finished presenting the Blote Safety Award to Mr. Jack W. Nottingham, who received the award for the Tracy Field Division. Photo PX-D-66432.



Assistant Regional Director H. E. Horton is shown above speaking to more than 100 persons attending the Blote Safety Award Dinner. He highly commended the field divisions' personnel for their fine safety performance during calendar year 1969. Photo PX-D-66433.





Mr. R. W. Cary, Regional Safety and Claims Officer, is shown speaking at the Blote Safety Award Dinner adding his congratulations to those made by Mr. Horton and encouraging all personnel in the Region 2 field divisions to continue their fine efforts in their accident prevention programs. PX-D-66434.

#### REGION 1 WINS COMMISSIONER'S POWER OPERATIONS AWARD OF MERIT TROPHY

Commissioner Ellis L. Armstrong presented Regional Director Harold T. Nelson with the Commissioner's Power Operations Award of Merit Trophy at Wenatchee, Washington, on April 1, 1970, in recognition of Region 1's error-free performance in its complex power operations programs throughout fiscal year 1969.

At the presentation Commissioner Armstrong said, "This award is a proper tribute to those Reclamation people whose reliability and dedication to excellence is as essential to a power operations program as the electrical energy that is produced at our hydro-powerplants throughout the West."

During the fiscal year ending last June 30, Region 1's power operations staff performed 2,575 switching programs with but a single error. Over half of those operations were performed by the employees at Grand Coulee Dam.



## CONSTRUCTION SAFETY AWARD

Universal Constructors, Inc., of Albuquerque, New Mexico, were recently presented the Bureau of Reclamation's Construction Safety Award in recognition of their aggressive accident prevention program and the exemplary accident prevention record obtained during construction of the siphons and main canal of the Navajo Indian Irrigation Project, Farmington, New Mexico. During the period from December 23, 1966, through November 6, 1969, Universal Constructors' employees worked in excess of 427,183 man-hours in constructing the \$6,800,000 portion of the main canal and siphons with the number of disabling injuries and the number of days lost resulting from these injuries well below the Bureau of Reclamation 3-year average.



Mr. A. E. Schumacher, above left, formerly Project Manager for Universal Constructors, Inc., (presently President of Co-Con, Inc.) and Mr. Art Peterson of Universal Constructors, Inc., second from left, receive the Construction Safety Award from Mr. R. B. Ledyard, right, Regional Engineer, Amarillo, Texas. Mr. Bert Levine, Project Construction Engineer, second from right, looks on. Photo P809-529-2605NA.



Mr. William C. Bouett (above center) is shown presenting the Construction Safety Award to Safety Director D. T. Lewin (left) and General Superintendent A. J. Viale (right) of the S & Q Construction Co. Mr. Bouett was the Acting Construction Engineer for the Red Bluff Diversion Dam fish trap and modifications. An average of 14 employees of the S & Q Construction Co., South San Francisco, California, completed the job in 1 year, working 20,287 hours without a single disabling injury. Photo P725-200-3235NA.



Mr. E. J. Brannan, Project Construction Engineer, Fresno, California, is shown above presenting the Construction Safety Award to Mr. Tom Veith of Industrial Pipelines, Inc., for completion of a job on the Westlands Water District Distribution System without experiencing a lost-time injury. Photo P805-243-2186NA.

# FROM THE FIELD

Region 1, Boise, Idaho--Safety and Construction Engineers Conference:



Regional Director H. T. Nelson is shown above welcoming participants to the Safety and Construction Engineers Conference held in the Regional Office, U.S. Federal Building, Boise, Idaho. (Photo PX-D-66435). In the opening session of the conference on January 20, 1970, Regional Director Harold T. Nelson said: "Everyone in our organization, particularly management, must play a greater role in carrying out a more aggressive accident prevention program. Those of us charged with administration must plan for and develop our people in such a manner as to make it possible for these people to operate in a safe manner. The greatest values in our business are human life, health, and the well-being of our employees. Training employees to work safely, correcting unsafe conditions, investigating and reporting all accidents and taking appropriate action to protect the public are all essential ingredients of a successful safety program. Therefore, I ask each of you at this conference to make an extra effort in the months ahead to provide the leadership necessary to build proper respect toward our safety program."



Mr. B. L. Mendenhall, Chief, Engineering and Construction Division, Columbia Basin Project, Ephrata, Washington, is shown below speaking to conferees on "Contract Administration." Photo PX-D-66436.



Folsom Field Division, Folsom, California--Number Crisis:

"Whats wrong with working 4,444 days without a lost time accident, a milestone Folsom Field Division passed Wednesday, January 28th?" asks Chuck Heine, Administrative Officer. "Nothing at all, would be the normal reaction. Matter of fact, a pretty good record--best in the Bureau of Reclamation."

Just one thing, though, the big board keeping track of the days at the entrance to Folsom facilities, changed daily, couldn't record the event. Heine explains: There just weren't enough "4's" printed on the 5 x 8 individual plywood cards to take care of the situation. It was quickly remedied by Fred Rezac, General Maintenance Foreman, who brushed up an acceptable figure "4" on a piece of cardboard to save the day.

If all goes well the next crisis will arrive over 3 years from now, if 5,555 days are recorded. There are only three "5's" in the numeral kit.



Region 3, Boulder City, Nevada--Employees Complete Bureau of Mines First Aid Training: Pictured below are two first aid classes being conducted in Region 3. These are typical of the continuous training being given at Reclamation offices. Mrs. Mildred Rhoades, Regional Safety Clerk, is shown demonstrating mouth-to-mouth resuscitation, and in the second picture the employees are learning methods of transporting the injured.



Photo PX-D-66437



Photo P423-300-9974NA

Region 3, Boulder City, Nevada--Scuba Diving Trainees: Messrs. Al Jonez, Dick Brown, Leon Bleggi, Davie Branstetter, Howard Carver, Gary Frey, Max Groom, Dean Johanson, Bill Young, and J. C. Belcher, Jr., are shown below undergoing equipment familiarization training on Lake Mead for a place on Region 3's Under Water Investigation Team. Upon completion of training, all will be certified, with five of the trainees selected for the team and the remainder serving as alternates. Photos P423-300-9973NA and P423-300-9971 NA.



Region 3, Boulder City, Nevada--Annual Regional Safety Conference:  
 Region 3, Bureau of Reclamation, held its Annual Regional Safety Conference in Boulder City, Nevada, on March 31 - April 1, 1970. The conference was attended by management and safety personnel in Region 3, and included speakers from the Regional Office and representatives from labor, manufacturing and construction. Pictured below, standing left to right are: Messrs. Frank J. Kouba, Regional Safety Engineer; Dale Marr, representing Operating Engineers Union Local No. 3, San Francisco, California; W. L. Phillips, Assistant to the Regional Director; Richard L. Daley, representing Morrison-Knudsen Company, Boise, Idaho, and George See, representing the Caterpillar Tractor Company, Peoria, Illinois. Photo PX-D-66439.



During the Conference, the Regional Director's Safety Awards for exemplary devotion to the principles of safety in completing the year 1969 without a disabling injury were presented. Mr. W. L. Phillips, Assistant to the Regional Director, is shown below presenting awards to the following, left to right: Messrs. D. B. Woltersdorf, Area Engineer, Southern California Development Office; G. A. Samson, Construction Engineer, Southern Nevada Water Project; Frank Lord, Project Manager, Boulder Canyon Project, and T. H. Moser, Project Manager, Yuma Projects Office. Standing in rear is Mr. Frank J. Kouba, Regional Safety Engineer. Photo PX-D-66438.





Parker-Davis Project, Phoenix, Arizona--Forklift Training:

Eighty-eight Reclamation employees in the Phoenix area recently completed a refresher course in the operation of forklift trucks. Photo PX-D-66440. The program was designed to acquaint occasional operators with the engineering principles of the lift truck, basic operating instructions, loading operations, type of pallet and containers, etc. The course consisted primarily of classroom instruction in forklift processes, nomenclature, discussion of controls, basic operating instruction; then refresher fieldwork consisting of raising a loaded pallet from the ground, operating the forklift truck through an obstacle course (see bottom picture below), depositing the load on a dock, then returning it to its original position near the obstacle course. Photo PX-D-66441.

The purpose of the course was to establish operating proficiency of those who have occasion to operate a forklift truck, licensing them, then restricting forklift operations only to those who are licensed. (See Photos PX-D-66440 and PX-D-66441 below.)

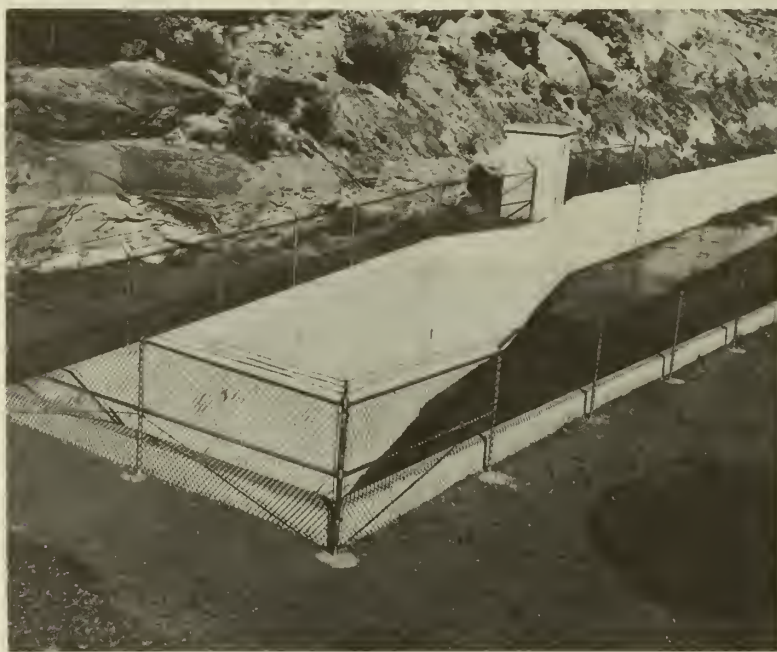




Navajo Indian Irrigation Project, Farmington, New Mexico--Safety  
and Protection of Completed Works:



Completed concrete-lined Main Canal in a view looking upstream from the inlet of Tunnel No. 2. Note protective fencing. Photo P809-529-2411A.



View of protective fencing at inlet of Gobernador Siphon. Photo P809-529-2567NA.

North Platte River Projects, Casper, Wyoming--Safety Citation Presentation: Mr. G. Dan Winans, Regional Safety Engineer, recently presented Region 7's Safety Citation to seven groups of employees from the Projects Headquarters for completing 4,000 workdays without a disabling injury. Pictured below are Division Chiefs and Branch Heads who accepted the citations on behalf of employees under their supervision. Seated, left to right: Kenneth D. McMurry, Head, Communications Engineering Branch; R. M. Sensintaffar, Project Manager; G. Dan Winans, Regional Safety Engineer; Bernard F. Cronin, Chief, Engineering and Projects Development Division. Standing, left to right: Ralph D. Asbridge, Chief, Power Division; Lloyd E. Bowman, Chief, Administrative Services Division; William R. Young, Head, Systems Engineering Branch; Peter F. Anker, Chief, Water and Land Operations Division, and Charles H. Saunders, Projects Safety Officer. Photo P144-703-4202NA.



South Platte River Projects, Loveland, Colorado--Safety Glasses: The value of safety glasses is emphasized in the picture below. Mr. Donald J. Kennedy, an employee of the South Platte River Projects, who was wearing these safety glasses, was not injured when a nail, being pulled from a board, came loose and hit the lens. Plain lenses or no glasses at all would have no doubt resulted in serious injury. Photo P245-713-4574NA.



Glen Elder Unit, Missouri River Basin Project, Kansas--Contractor Employee Becomes Turtle Club Member: Mr. Bill Ryan, an employee of Wentz Construction Company, became a member of the Turtle Club after his hard hat protected him from serious injury. Pictured below are Bureau Safety Officer Allen Currie, Messrs. Bill Ryan and H. Wentz. Mr. Ryan is shown receiving a new hard hat with the "Turtle Club" insignia and a membership certificate. Photo P495-731-579NA.



The objective of the Turtle Club is to emphasize the importance of safety head protection. Their motto is "Shell on Head--We're not dead." The international organization, founded in 1946, is sponsored by the E. D. Bullard Company, a manufacturer of hard hats. To be eligible for membership an individual must credit the wearing of a safety hard hat with preventing a fatal or serious head injury.

Glen Canyon Unit, Colorado River Storage Project, Page, Arizona--Training in Small Boat Operation: During March 1970 several Bureau employees from Region 4 attended the Basic Seamanship, Small Boat Operation Course, presented by Glen Canyon National Recreation Area--National Park Service and Coast Guard Auxiliary--at Page, Arizona. The 3-day course included safe boat operation, inspection, fire prevention, and navigation, including one evening session on night navigation.

\* \* \* \* \*

Education is something you get when your father sends you to college. But it isn't complete until you send your son there.



Colorado River Storage Project Power Operations--Live-line Bare-hand Training Program: A 10-day live-line bare-hand training course, conducted at the Shiprock Substation in New Mexico during March 1970, was attended by 20 participants and 50 observers. It is a requirement of the Bureau of Reclamation that workmen using the live-line bare-hand technique shall have satisfactorily completed a minimum of 10 days of instruction and practice. Additionally, workmen shall be examined at least once annually to determine adequacy of their knowledge of rules and procedures for performance of this technique, their ability to estimate clearance distances visually while elevated into working positions, and their ability to perform adequately the bare-hand work, including the control and positioning of the aerial-lift buckets. Photograph below shows Victor Whitehouse, Safety Director for the International Brotherhood of Electrical Workers and N. Wayne Jackson, Head, Transmission Lines Section, CRSP Power Operations Office, discussing the work in progress at the training program. Photo P594-427-755NA.



\* \* \* \* \*



# WATER SAFETY

## NORTHERN COLORADO WATER SAFETY COUNCIL

The Northern Colorado Water Safety Council, a community organization formed through the efforts of Operation Westwide for the promotion of water safety, held its annual dinner meeting at the Community Building in Loveland, Colorado, on November 1, 1969. Highlight of the meeting was the presentation of awards to individuals the Council felt had made outstanding contributions to water safety during the past year.

Mr. James Williams was presented a plaque by Mrs. William Schwab, Council Vice President, (see photo below) for his successful effort in saving the lives of a family whose boat capsized at Carter Lake this past summer. Photo PX-D-66426.

An award was made to the members of Uncle Josh Productions, a local high school group, for producing a film, "Watertrap," for the Safety Council. Trophies were also presented to Sammy Hewson (shown below on the right) Photo PX-D-66427 and Roland Osborn (left) by Mr. Al Stevens, Council President. These two boys had major acting parts in the production of the film. The film was premiered during the evening and was well received by those present, which included representatives from Loveland city government offices and members of civic organizations who were guests of the Council. The film will be used by the Northern Colorado Water Safety Council in connection with its annual school water safety programs, and is available for use by interested organizations.



\* \* \* \* \*

## CONSTRUCTION SAFETY FILMS

---Comments by L. M. Hayes, Jr.,  
Regional Safety Engineer,  
Billings, Montana

THE ROADBUILDERS - 16mm, color sound, 21 minutes. Recalls steps (Fair) taken in roadbuilding to ensure safety for workers and motorists.

For availability inquire of Construction Safety Associations of Ontario, 74 Victoria St., Toronto 1, Ont., Canada.

SOMETHING CONCRETE - 16mm, color, sound, 24 minutes. Stresses many facets of accident problems around concrete construction jobs.

Most phases of concrete building construction with emphasis on safety--1968 award winner--good film.

For availability inquire of Construction Safety Associations of Ontario, 74 Victoria St., Toronto 1, Ont., Canada.

ON TOP OF THE PROS - 16mm, color, sound, 12 minutes. Using sports as examples, film stresses need for head protection.

Strictly hard hat film related to use of head protection in sports--not too effective for us.

For availability inquire of Sponsor - Mine Safety Appliances Co., 201 N. Braddock Ave., Pittsburgh, Pa. 15208.

DANGER ALIVE - 16mm, color, sound, 20 minutes. Tells importance of electrician's responsibility for safety on construction projects.

Electrical phase only of building construction--good for that type construction.

For availability inquire of Construction Safety Associations of Ontario, 74 Victoria St., Toronto 1, Ont., Canada.

WHAT'S IT GOING TO COST YOU - 16mm, color, sound, 10 minutes. Dramatizes necessity for contacting utility companies before working on underground projects.

Shows comic approach to construction operations getting into gas, water, sewer, electric lines and telephone cable--good film for ice breaker at any meeting.

For availability inquire of Consumers Power Co., 212 W. Michigan Ave., Jackson, Mich. 49201.

THE FLAGMAN - 16mm, color, sound, 15 minutes. Demonstrates the proper role and procedures of the Flagman as Public Relations, as well as Traffic Control Specialist. (Very common.)

For availability inquire of Western Pennsylvania Heavy & Highway Construction Industry Advancement Program Fund, 1201 Banksville Road, Pittsburgh, Pa. 15216.

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#### STANDARDS FOR THE INSTALLATION AND USE OF LIFE SAFETY PROTECTION EQUIPMENT FOR TOWER, HAMMERHEAD, AND OTHER HORIZONTAL BOOM CRANES

AEC and AEC contractors using tower, hammerhead, or other horizontal boom cranes shall provide protection against falling for workmen required to perform duties on the horizontal boom of any such crane. Protection provided shall afford safe access to all parts of the boom requiring inspection, lubrication, or other regular service.

The following shall be considered minimum requirements, but shall not preclude the use of other approved safeguarding methods providing equal or better protection, such as complete catwalks, safety nets, etc.

- a. A stranded wire safety cable shall be installed securely above the entire length of the boom, with intermediate supports as necessary.
- b. Cables, fastenings, and supports shall be of a size sufficient to support the weight of the maximum number of men necessary to perform any required work at one time, with a factor of safety of five (5).
- c. Cable and fastenings shall be tested with a dummy load equal to twice the man-load for which it will be used. Tests shall be performed prior to initial use by workmen each time the crane is erected, and at such intervals as specified by the local authority having jurisdiction, but not less than quarterly during regular operation.
- d. Workmen required to perform work on the boom shall wear approved safety belts and shock absorber safety lanyards with self-closing hooks and shall be required to be hooked onto the safety cable at all times when walking, climbing, or working on the horizontal boom of such cranes.

NOTE: Method of attachment and location of strain-bearing parts shall be such that they will not weaken or damage the structural members of the boom or interfere with operations.

\* \* \* \* \*



## EQUIPMENT REPAIR REHABILITATES DISABLED

---By R. J. Searle, Regional Safety Officer  
Salt Lake City, Utah

On December 30, 1961, Carl Schwab reported to work looking forward to a prosperous future. He was in good health, had a steady job providing him and his family with a comfortable living. Later that day all Carl Schwab's future plans and security were crushed with the same rock that fell from the mine roof and struck him on the neck. After painful months in the hospital, Mr. Schwab was informed that medicine could do no more and he could look for nothing better than confinement to a bed for his remaining years.

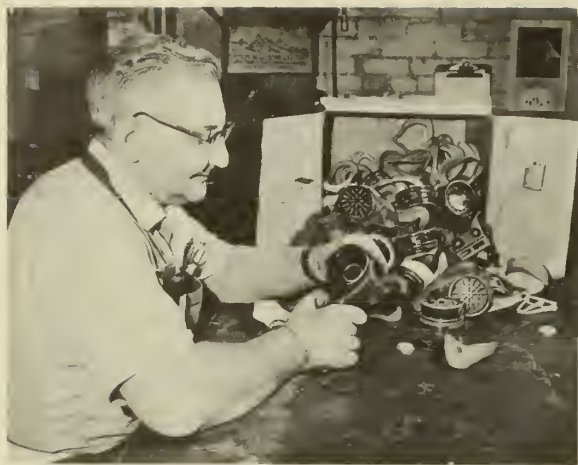
Several years later a young man named Acel Goodman was driving home from work anxiously looking forward to playing with his two children. Suddenly the truck went out of control and Mr. Goodman was thrown through the windshield landing in the road. His bright future too was dashed to bits along with the severed spinal cord that placed him in a wheelchair for the rest of his life.

It was then that the foresight of a group of Utah men and women, who ten years ago started the Easter Seal Rehabilitation Workshop plus a program under the management of Ted Priestley, Workshop Supervisor, gave these two and others hope and a chance to find a new productive life. During Mr. Priestley's search for new skills that could be developed for the handicapped, an industrial hygienist of a large industry mentioned the difficulty and expenses encountered in reconditioning safety equipment. Could this work be done for a reasonable figure by the handicapped? A study was made to determine costs and method for such an undertaking and if the demand justified the expense of starting the program.

The first road block immediately apparent was the fact that manufacturers of equipment also supplied industry with repair parts at distributors' costs. Could the Easter Seal Workshop purchase these parts at the same cost? The manufacturers (and there were several) said they would be glad to cooperate, and suggested the workshop purchase parts in large quantities, thereby taking advantage of additional savings which could help defray shipping costs.

Next came the problem of pickup and delivery. Industries from several states had agreed to using the service if practical. The answer was obvious--collect all respirators and parts in a box at the company's warehouse as they were turned in, ship entire contents to the workshop for sorting and repairing, and pay the workshop for the number of reconditioned units returned plus cost of replacement parts and postage. The plan proved to be both economical and desirable for industry. Arrangements were made and agreements signed.

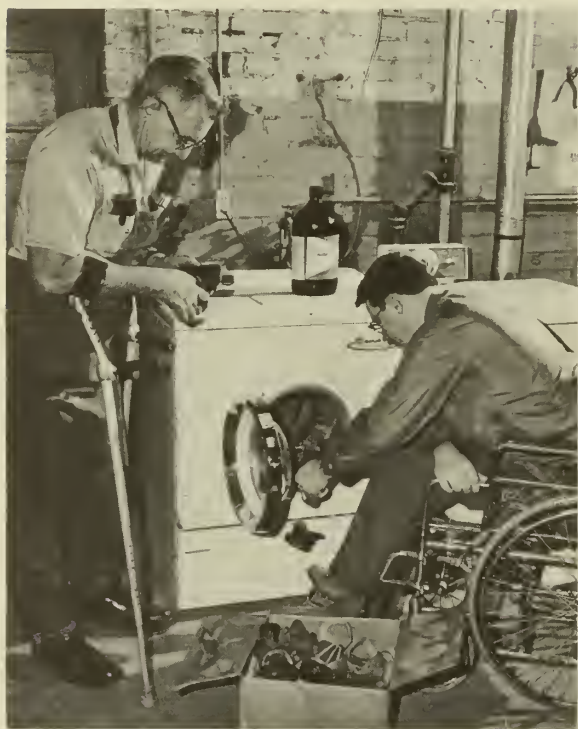




Carl Schwab sorts respirator parts as they are received at the workshop from industry.  
Photo X-400-790.



Acel Goodman reassembles reconditioned and sanitized respirators for shipment to industry.  
Photo X-400-792.



A standard washer and dryer are used along with a germicidal detergent to clean and sterilize various respirator parts.  
Photo X-400-791.



An instruction booklet is placed in the plastic bag with the repaired and reassembled respirator before shipment.  
Photo X-400-793.

Now the wheel was about to make its full circle--the full circle of industries through cooperative efforts with a charitable organization providing jobs for employees disabled in accidents. Mr. Schwab, through determination and drive for a more useful life, had defied the medical profession's diagnosis and could now stand on crutches and sit up and move his arms and hands sufficiently to do many tasks. Mr. Goodman, while confined to a wheelchair, could do many of the functions required for repairing equipment. These two gentlemen were brought to the workshop, along with other disabled persons, and trained to recondition the units.

The program began in earnest, and companies found that for 45¢ plus cost of parts and postage they could receive, for each unit submitted, a completely reconditioned and sanitized respirator. For 25¢ plus parts and postage they could receive a completely reconditioned pair of nonprescription safety glasses.

The program was an instant success and now provides benefits not originally planned. Each respirator is individually packed in plastic bags. Each package contains a card with instructions for respirator use and type of cartridge recommended for different toxic contaminants. Eye glasses are individually packaged in plastic bags and in most cases cannot be distinguished from a new pair.

But the real benefit can be seen in the faces of these people who again feel the pride of accomplishment.

What does the future hold? Mr. Priestley expressed it this way, "We have the know-how; we have the people with a desire, and we can use all the business industry can send us. The rest is up to them."

\* \* \* \* \*

Patient: "Doc, tell me in plain English exactly what's wrong with me."

Doctor: "You are just plain lazy."

Patient: "Now could you give me the medical term to tell my friends?"

A wife said to husband at a buffet supper, "That's the fifth time you've gone back for more chicken. Doesn't that embarrass you?"

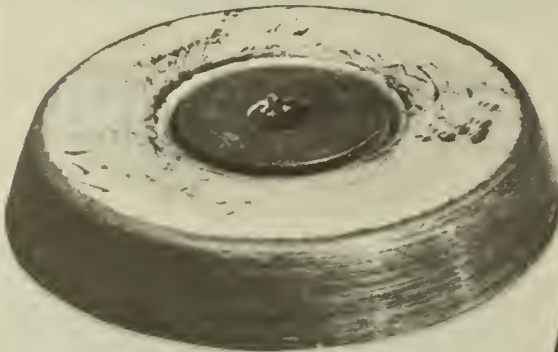
"Not at all," he said. "I keep telling them I'm getting it for you."

\* \* \* \* \*

## SAFETY GUARDS ON PORTABLE GRINDERS

---By Leo J. Riordan, Safety Officer  
Curecanti Unit CRSP  
Montrose, Colorado

Paragraph 10.2.1 of Construction Safety Standards requires safety guards on all portable grinders. Shown below is the revolving cup guard for use with concrete and masonry grinding wheels. The guards meet ANSI B7.1 safety code and protects the operator against flying particles in case of wheel failure.



Revolving Cup Guard



Grinding Wheel



Guard mounted  
on wheel

\* \* \* \* \*



## HIGH-ENERGY STORAGE SYSTEMS' SAFETY

(This article, by John G. Murray, Head of the Power Engineering Section of the Plasma Physics Laboratory of Princeton University, is reprinted from the SAFETY NEWSLETTER, Research and Development Section, March 1970, with permission of the National Safety Council.)

If all energy storage systems were safe, the number of serious accidents in industry would be greatly reduced. This assumes considering stored energy in a broad sense, which includes: mechanical energy storage, such as compressed springs, inertial energy, and compressed gases; chemical energy storage, such as explosives, batteries, and slow chemical reactions; nuclear systems; and electrical energy storage systems. Many are combinations of the above, such as the automobile.

In research laboratories the high-energy systems of major consideration are generally fewer in number. This discussion is limited to electrical capacitor and inductor energy storage devices.

In defining high energy, it should be noted (as per C. F. Dalziel in references 1 and 2) that approximately 50 joules can cause death, and hence should be considered "high." There is nothing absolute about this quantity of energy, since the exact amount depends upon a number of human factors. If the energy comes in the form of an electrical shock, a great deal depends on how the current passes through the body, the conduction through the skin, the condition of the heart, and when the shock occurs in the heartbeat cycle, as noted by Dr. James R. Jude and his co-workers at John Hopkins University.

To obtain an idea of the amount of energy involved in various systems, the following examples are given: In one pound of TNT there are 1.75 megajoules of energy; in a transmission line operating at 4 kv, 100 kilojoules of energy in one half-cycle can be obtained; and in a 130-kv system, energy in the range of a megajoule is stored in the system's capacitance and inductance. However, in laboratories there are generally many capacitor or inductor electrical storage systems of a few hundred or a thousand joules, and there are a few in the megajoule region. At 10 kv, 50 joules of energy can be stored in a 1 microfarad capacitor, which can be in a case approximately 10 in. x 10 in. x 3 in.

The dangers associated with electrical energy storage components are as follows (from reference 3):

### Capacitors

- I. Capacitors may become recharged even after having been disconnected and discharged.
- II. Shorting or discharging can produce an electrical arc and cause burning by radiation, or by flying molten material.



- III. Internal faults may blow up capacitor containers.
- IV. Liquid dielectrics may constitute a fire hazard and produce a toxic gas.

#### Inductors

- I. Large electromagnets produce fields that can exert an attractive force on adjacent magnetic material.
- II. Damaging currents can be produced in nearby conducting material, if the current is changed rapidly in the inductor or coil.
- III. Internal mechanical forces are produced that can cause damage if a mechanical fault occurs.
- IV. If two adjacent coils are energized, they may produce abnormally high forces on one another.
- V. Sudden interruption or a change in current can produce high voltages.
- VI. When large inductors are used in laboratories, there are generally cooling systems that can overheat and produce hazards associated with hot and high pressure liquids.

The protection for an inductor is rather well known. Preventing a fast change of current by the use of switches or fuses, building the unit to take fault forces, protecting against high temperature, and providing sufficient space to prevent field problems has, in many cases, provided proper protection.

Capacitor protection is not as straightforward. Items to consider are: fault currents which produce forces to pull buswork apart; an exploding capacitor which not only is a fire and toxic hazard, but also can spray oil dielectric over the area. When an internal fault occurs, insulators often shoot out like a projectile and, therefore, should always be aimed in a direction which would produce a minimum of harm.

As noted in reference 3, the methods of protecting a capacitor bank are:

- A. Pressure-sensing devices.
- B. Pressure-relief chambers.
- C. Isolation of groups of capacitors by:
  - 1. Multiple-charging resistors.
  - 2. Multiple switches for small groups of capacitors.

- D. Resistors in series with each capacitor.
- E. Crowbars to bypass fault currents.
- F. Mechanical barriers.
- G. Fuses.

The installation of fuses seems to be the most straightforward, but application data on high-voltage DC fuses is not available and requires developmental testing.

The power supplies for charging a large energy storage system should be given more consideration than is required for a standard rectifier. Because the stored energy is available to flow into the power system, controls, or instrumentation, a safe system will contain added safety features, such as those noted below:

1. Two or more safety barriers or components. For example, a voltage doubler rectifier with the charging capacitor rated for the full bank voltage provides an energy-limiting component between the bank and the rectifier supply transformer.
2. Well-grounded metal barriers should be installed between instrumentation or low-voltage components and the high-energy system.
3. Access to equipment should be kept locked and interlocked, and the arrangement should be such that reliable capacitor grounding or shorting switches must be closed before access can be obtained.
4. Instrumentation, such as voltage dividers, should have multiple series and parallel components, so that open-circuited resistors, or arcs across resistors will not result in danger to personnel or equipment.

The instrumentation portion of high-energy systems usually is the part that has had the least amount of planning and is the most potentially dangerous. There are always rationalizations as to why the person responsible for the experiment or development cannot take the time, spend the effort planning ahead, or have the money to install the proper instrumentation safety features. Some of these features are:

1. A good grounding system with low inductive loops having a small induced voltage when high current pulses or faults occur.
2. Isolation transformers with grounded shields large enough to handle maximum fault currents.
3. Voltage and current transducers with sufficient isolation.

4. Extra series and parallel components on capacitors and resistor voltage dividers to prevent serious damage or hazard in the event of failure.
5. Data transmission by radio signals or light beams.

Most installations of high-energy storage systems can be made perfectly safe at relatively low cost if handled properly. All installations I have seen that were believed to be hazardous were the result of insufficient knowledge or failure to take the time and effort to overcome the hazards. The excuses were that the safety cost was prohibitively high, or the time was not available.

In the installation of capacitor bank energy storage systems, the danger lies in the fact that the units look and sound the same energized as they do de-energized.

If one designs a system so that more than two simultaneous faults must occur before someone is injured or serious damage results, and in all cases at least two reliable safety measure devices are required, the possibility of an accident is reduced to what some people call "carelessness".

The well-trained man who knows most about the system is likely to be the most "careless" because he is not afraid of it. Work in potentially dangerous areas should be done under the watchful eye of a safetyman.

Top management must have the prime responsibility for the safety of a plant, but good, well-planned engineering and technician evaluation are also important factors, particularly in research and development areas where changes and revisions to systems are frequently required.

#### References:

1. "Electrical Safety Guides for Research," AEC Safety and Fire Protection Technical Bulletin No. 13, December 1967.
2. C. F. Dalziel, "The Effects of Electric Shock on Man," AEC Safety and Fire Protection Technical Bulletin No. 7, 1959.
3. J. G. Murray and G. Bronner, "Application of Fuses for DC Capacitor Banks," IEEE Conference Paper CP621437, September 1962.

This work was performed under the auspices of the U.S. Atomic Energy Commission, Contract No. AT (30-1)-1238.

# SAFETY PERFORMANCE RECORD

## CUMULATIVE QUARTERLY REPORT GOVERNMENT FORCES

1st QUARTER, 1970

PERIOD FROM JANUARY 1, 1970 THROUGH March 31, 1970

REPORTING OFFICE	NUMBER OF EMPLOYEES	MAN HOURS	DISABLING INJURIES		DAYS LOST	FREQUENCY RATE	SEVERITY RATE
			CUMULATIVE THIS YEAR	CUMULATIVE THIS YEAR			
Washington Office	295	146,888					
Denver Office	1,313	655,712					
REGION 1							
Boise Regional Office	177	73,687	2		38	27.1	516
Central Snake Project	39	16,763					
Chief Joseph Dam	35	15,583					
Columbia Basin Project	638	318,232					
Green Springs Powerplant	2	1,044					
Hungry Horse Project	46	20,847					
Lower Columbia Development Office	55	22,870					
Lower Teton	7	3,130					
Minidoka Project	69	36,237					
Snake River Development Office	55	27,777					
Third Powerplant Construction Office	188	82,194					
Upper Columbia Development Office	47	22,110					
Yakima Project	31	13,826					
Totals & Averages	1,389	654,300	2		38	3.1	58
REGION 2							
Sacramento Regional Office	539	300,731					
Regional Drill Crew	39	20,623					
Auburn-Folsom South Unit	209	102,204					
Cachuma Operations Field Branch	2	992					
Central Coast Dev. Field Branch	4	1,920					
Folsom Field Division	74	38,736					
Fresno CVP Construction Office	131	62,135					
Fresno Field Division	142	69,960					
Klamath Project Office	17	7,469					
Lahontan Basin Projects Office	33	17,664					
Napa Development Field Branch	2	992					
Sacramento Valley CVP Constr. Office	114	55,844	1		5	17.9	90
San Luis Unit CVP Construction Off.	65	35,581					
Shasta Field Division	141	70,065					
Solano Operations Field Branch	3	1,488					
Tracy Field Division	162	81,811					
Upper North Coast Dev. Field Branch	3	1,488					
Totals & Averages	1,680	869,703	1		5	1.1	6
REGION 3							
Boulder City Regional Office	188	90,720					
Boulder Canyon Project	142	71,520					
Dixie Project	10	3,018					
Lower Colorado River Project	207	92,202					
Parker-Davis Project	337	190,182					
Phoenix Development Office	90	42,880					
Southern California Dev. Office	22	9,583					
Southern Nevada Water Project	87	42,176	1		12	23.7	285
Yuma Projects Office	133	63,840					
Totals & Averages	1,216	606,121	1		12	1.6	20
REGION 4							
Salt Lake City Regional Office	192	102,033					
Central Utah Projects	181	84,640					
CRSP Power Operations	261	130,711					
Curecanti Unit	78	35,726					
Durango Projects Office	26	11,897					
Grand Junction	51	24,512					
Lovan Development Office	5	2,560					
Lyman Project Office	24	9,178					
Upper Green River Projects Office	19	8,932					
Totals & Averages	839	410,189					
REGION 5							
Amarillo Regional Office	99	47,923					
Albuquerque Development Office	34	16,308					
Austin Development Office	42	22,016					
Lower Rio Grande Project	1	512					
Middle Rio Grande Project	237	110,795	1		30	9.0	271
Navajo Project	72	37,464					
Oklahoma City Development Office	20	8,620					
Pecos River Office	17	6,782					
Rio Grande Project	201	95,141					
San Juan-Chama Project	66	35,358					
Totals & Averages	789	381,919	1		30	2.6	79
CONSOLIDATED TOTALS							
TOTALS LAST YEAR (19 )							

\*FATALITIES INCLUDED IN TOTAL DISABLING



**SAFETY PERFORMANCE RECORD**  
CUMULATIVE QUARTERLY REPORT  
GOVERNMENT FORCES

1st QUARTER, 1970..

PERIOD FROM JANUARY 1, 1970.. THROUGH.. March 31, 1970..

REPORTING OFFICE	NUMBER OF EMPLOYEES	MAN HOURS	DISABLING INJURIES		DAYS LOST	FREQUENCY RATE	SEVERITY RATE
		CUMULATIVE THIS YEAR	CUMULATIVE THIS YEAR	FATAL *	CUMULATIVE THIS YEAR	CUMULATIVE THIS YEAR	CUMULATIVE THIS YEAR
REGION 6							
Billings Regional Office	151	72,160					
Geology and Drill Crews	10	4,831					
Canyon Ferry Project	18	8,714					
Fort Peck Project	40	18,982					
Missouri-Oahe Projects	223	109,280					
Missouri-Souris Projects	327	127,257					
Power System Operations Office	51	24,480					
Riverton Project	4	1,859					
Upper Missouri Projects	63	27,816					
Yellowtail Project Office	39	18,442					
Totals & Averages	926	413,841					
REGION 7							
Denver Regional Office	174	87,248	1		12	11.5	138
Fryingpan-Arkansas Project	141	69,920					
Glen Elder Unit	26	13,488					
Kansas River Projects	97	49,872					
Niobrara-Lower Platte Dev. Office	30	14,880					
North Platte River Projects	227	127,920	1		15	7.8	117
South Platte River Projects	155	77,840					
Totals & Averages	850	441,168	2		27	4.5	61

# SAFETY PERFORMANCE RECORD

## CUMULATIVE QUARTERLY REPORT

### CONTRACTOR FORCES

1st QUARTER, 1970

PERIOD FROM JANUARY 1, 1970 THROUGH March 31, 1970

REPORTING OFFICE	NUMBER OF EMPLOYEES	MAN HOURS	DISABLING INJURIES		DAYS LOST	FREQUENCY RATE	SEVERITY RATE
		CUMULATIVE THIS YEAR	CUMULATIVE THIS YEAR	FATAL #	CUMULATIVE THIS YEAR	CUMULATIVE THIS YEAR	CUMULATIVE THIS YEAR
REGION 1							
Chief Joseph Dam Project	16	4,091					
Columbia Basin Project	166	59,910	1		4	16.7	67
Lower Teton		50					
Minidoka Project	8	2,017					
Third Powerplant Construction Office	441	258,651					
Yakima Project	87	22,110					
Totals & Averages	678	346,829	1		4	2.9	12
REGION 2							
Auburn-Folsom South Unit	39	17,340					
Fresno CVP Construction Office	16	26,544					
Fresno Field Division		1,842					
Lahontan Basin Projects Office	4	4,870					
San Luis Unit CVP Construction Off.	42	26,102					
Sacramento Valley CVP Constr. Office	115	27,720					
Tracy Field Division		166					
Totals & Averages	216	104,584					
REGION 3							
Boulder Canyon Project		400					
Lower Colorado River Project	15	16,026					
Parker-Davis Project	55	40,569					
Southern Nevada Water Project	230	114,692					
Yuma Projects Office	12	2,202					
Totals & Averages	312	173,889					
REGION 4							
Salt Lake City Regional Office	2	362					
Central Utah Projects	68	50,075					
Quercanti Unit	56	30,166					
Durango Projects Office	8	951					
Totals & Averages	134	81,554					
REGION 5							
Navajo Indian Irrigation Project	8	951					
Pecos River Office		3,624					
Rio Grande Project		1,421					
San Juan-Chama Project	308	164,212					
Totals & Averages	316	170,208					
REGION 6							
Missouri-Ozark Projects	154	108,928	1		25	9.2	230
Missouri-Souris Projects	45	17,115					
Riverton Project		2,032					
Upper Missouri Projects	10	9,050					
Totals & Averages	209	137,135	1		25	7.3	182
REGION 7							
Fryingpan-Arkansas Project	12	23,129	2		7	86.5	303
Glen Elder Unit	36	5,054					
Kansas River Projects	33	12,738					
North Platte River Projects	7	3,228					
Totals & Averages	88	44,149	2		7	45.3	159
CONSOLIDATED TOTALS							
TOTALS LAST YEAR (1969)	1,953	1,058,348	4		36	3.8	34
	3,264	6,298,647	72	3	20,250	11.4	3,214

\* FATALITIES INCLUDED IN TOTAL DISABLING









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# *Reclamation* **SAFETY NEWS**

SECOND QUARTER 1970



UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF RECLAMATION  
OFFICE OF CHIEF ENGINEER

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Front Cover Photo: A Third Powerplant contractor, the joint venture of Jelco, Inc., and Gibbons and Reed Company, was honored by the Bureau of Reclamation on April 13, 1970, at a luncheon held in Grand Coulee, Washington. The Bureau's Construction Safety Award was presented by Chief Engineer B. P. Bellport, center, to Mr. W. H. Kibbie, President of Jelco, left, and Mr. J. P. Gibbons, President of Gibbons and Reed, right, for their outstanding safety record compiled during 2-1/2 years of heavy construction work on plant and switchyard modifications at Grand Coulee Dam. (See page 4.) Photo P1222-142-8050-I.

Job accidents are a daily American tragedy. They take a cruel toll in life, disabling injury and production. We in this Administration are working hard to reduce this human and economic loss.

By setting an example, by preventing accidents and by improving safety practices, the Federal Government can lead the way for private industry.

I ask your help in this effort.



*Richard Nixon*



**FEDERAL SAFETY COUNCIL**



# BUREAU SAFETY PERFORMANCE

## 1970 CUMULATIVE ACCIDENT RECORD

January 1 - June 30, 1970

### A. GOVERNMENT FORCES

<u>Region</u>	<u>Injury index*</u>	<u>Frequency rate</u>	<u>Severity rate</u>	<u>Vehicle accident rate*</u>
Region 4	0.0	0.0	0	0.6
Region 6	0.0	0.0	0	1.6
Region 2	0.02	0.6	3	1.6
Region 3	0.4	1.6	28	1.7
Region 1	2.2	2.2	101	4.8
Region 7	5.6	4.6	122	3.9
Region 5	<u>7.5</u>	<u>5.0</u>	<u>150</u>	<u>1.2</u>
Totals to Date	0.6	1.5	43	2.1
<hr/>				
Totals 1969	10.7	1.6	671	3.1

\*Injury index is equal to frequency rate times severity rate divided by 100.  
Vehicle accident rate is the number of accidents per million miles driven.

### B. CONTRACTOR FORCES

<u>Region</u>	<u>Injury index</u>	<u>Frequency rate</u>	<u>Severity rate</u>	<u>Fatal injuries</u>
Region 1	1.4	4.0	35	0
Region 4	2.0	5.3	37	0
Region 2	2.7	4.4	61	0
Region 3	3.8	6.3	60	0
Region 5	18.6	5.6	333	0
Region 7	158.1	48.2	328	0
Region 6	<u>2,981.8</u>	<u>12.2</u>	<u>24,441</u>	<u>1</u>
Totals to Date	222.6	7.8	2,854	1
<hr/>				
Totals 1969	366.4	11.4	3,214	3

### C. RECLAMATION CIVILIAN CONSERVATION CENTERS

Frequency rate	0.8
Severity rate	14
Vehicle accident rate	13.3

## LOST TIME ACCIDENT ANALYSIS

Government Forces - 1970  
Second Quarter

Cumulative to Date:  
June 30, 1970

### A. ACCIDENT CLASSIFICATION

<u>Description</u>	<u>No.</u>	<u>Days lost</u>
Lifting	4	54
Handling materials and equipment	2	27
Falls of persons	5	229
Struck by object	1	12
Vehicles	<u>2</u>	<u>79</u>
Total	14	401

### B. OPERATIONAL SUMMARY

<u>Operation</u>	<u>Man-hours</u>	<u>No. of accidents</u>	<u>Days lost</u>	<u>Frequency rate</u>	<u>Severity rate</u>
Administration, Clerical and Design	3, 963, 288	2	20	0.5	5
Construction	1, 299, 103	3	139	2.3	107
Investigation	1, 080, 328	2	61	1.9	56
Power O&M	1, 960, 169	2	35	1.0	18
Irrigation O&M	<u>1, 038, 243</u>	<u>5</u>	<u>146</u>	<u>4.8</u>	<u>141</u>
Totals	9, 341, 131	14	401	1.5	43

\* \* \* \* \*

## TESTED SAFETY SLOGANS

It is a well-accepted fact that slogans and catch phrases are effective devices for making an impression on people. Here are a few good ones for safety promotion programs!

1. He saved a minute but lost a limb--now there's more time, but less of him.
2. Careless hurry can mean endless worry.
3. Your work injury can hurt your entire family.
4. Know the hazards . . . don't learn by accident.
5. You're wanted . . . ALIVE!

\* \* \* \* \*

# SAFETY AWARDS

## CONSTRUCTION SAFETY AWARD

Jelco, Inc., and Gibbons and Reed Company, Salt Lake City, Utah



Pictured above at the presentation ceremony of the Construction Safety Award on April 13, 1970, are (left to right): Messrs. L. A. Barnard, Vice President, Jelco, Inc.; J. R. Granger, Third Powerplant Construction Engineer; William Kibbie, President of Jelco, Inc.; B. P. Bellport, Chief Engineer; H. T. Nelson, Regional Director, and J. P. Gibbons, President, Gibbons and Reed Company (Photo 3PPV). The contractors were honored by the Bureau of Reclamation at a luncheon held in Grand Coulee, Washington, for their outstanding safety record in completing over 750,000 man-hours of heavy construction work with only one employee experiencing a disabling injury. This resulted in an accident frequency rate of only 1.3 accidents per million man-hours worked and a severity rate of 58 days lost per million man-hours worked.

The contract covered the modification of Grand Coulee Left and Right powerplants and the construction of a consolidated switchyard on the left bank of the river above Coulee Dam. This was the first contract awarded for the construction of the 3,600,000-kw Third Powerplant. To perform the work safely and to insure the uninterrupted flow of electric power throughout the contract period, the highest priority was placed on safety. Much of the work performed was in close proximity to high-voltage electrical facilities. Also, the contract required rock excavation and concrete placement, including the excavation of a high-voltage conduit tunnel.

DEPARTMENT OF THE INTERIOR  
CERTIFICATE OF SAFETY ACHIEVEMENT

The United States Department of the Interior Certificate of Safety Achievement was recently presented to the Auburn-Folsom South Unit CVP Construction Office for driving 634,839 miles without an accident from July 1, 1968 to October 3, 1969.



Shown above, from left to right: J. R. Hammond, Acting Assistant Regional Director, Region 2; R. W. Cary, Regional Safety and Claims Officer; D. R. Alexander, Acting Project Construction Engineer, and Fred J. Lasko, Project Safety Engineer. Photo P859-245-4726 NA.

The 175 employees of the Auburn-Folsom South Unit CVP Construction Office, Auburn, California, accumulated 1,174,748 man-hours without experiencing a disabling injury during the period August 9, 1966, through June 30, 1970. And this accident-free record is continuing!

\* \* \* \* \*



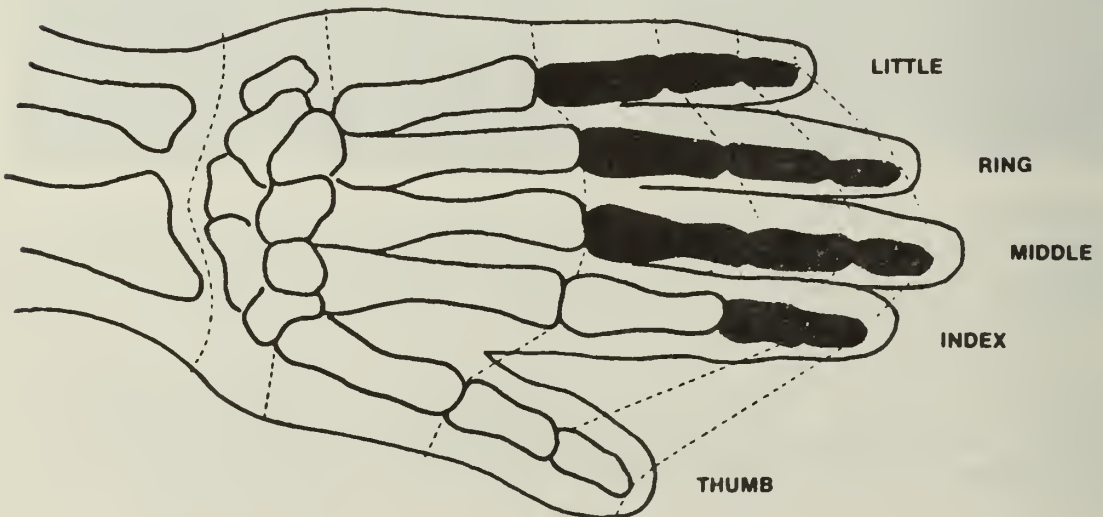
# ACCIDENT REVIEW

## HEAVY EQUIPMENT OPERATION

Activity: Refastening a forklift truck mast assembly to the truck body.

Accident situation and occurrence: Employee was working on a mast assembly consisting of a hydraulic hoist cylinder and two pairs of vertical rails, so arranged that one set of rails slides up and down within the other set. The arrangement permits the raising and lowering of cargo seated on forks attached to the inner set of rails. Connecting the rails in each set are horizontal cross supports at top and bottom. The mishap occurred when the injured employee failed to return the inner rail to the bottomed or collapsed position prior to completing the securing of the lower pivot mounts. As a result, the partially raised inner rail fell to the bottomed position, crushing his right hand between the lower cross supports of the two sets of rails.

Cause determination and prevention: The committee which investigated the accident concluded that, while the raising of the inner rails would facilitate the fastening operation, it is not the recommended procedure and was a violation of good safety practice. Correct procedures must be followed while performing maintenance and repair operations on forklift equipment.



Shaded areas show portions of fingers amputated.

Activity: Machine excavation of canal utilizing rubber-tired push-pull scrapers.

Accident situation and occurrence: In pulling away from the push cats, and still in low gear, the left tire on the tractor unit, located directly behind the operator, blew out. Investigation of the accident revealed the tire blew at a 45° angle, back and down, from the hub splitting the tire approximately 9 feet. Cross splitting occurred at both ends of the tire rupture indicating further splitting was restricted at one end by tire contact with the ground and the other end by tire contact with the fender of the tractor unit. The tire contact with the fender caused the cross tread on the tire to catch on the end of the fender. As the tire rotated, the fender that was mounted on the cab curled in against the tire and was forced forward, which in turn tore the cab mounting loose from the frame. As the cab moved upward and forward, the operator was caught between the operator's seat and the steering wheel, suffering fatal injury.

Cause determination and prevention: The tire was a steel cord tubeless, size 37.5 x 39 R with about 75 percent original rubber remaining at the time of the accident. Tire pressure was believed to be 70 pounds. Operating conditions were all near perfect and the load, haul, dump cycle did not exceed 250 yards. The tractor unit was equipped with roll protection, and the operator was wearing a hard hat and was using a seatbelt.

The contractor has welded a heavy pipe to the roll bars, extending horizontally immediately behind the operator in order to afford protection against a recurrence. The rear end of the fenders on this and similar machines are also to be flared out to eliminate the possibility of the tire tread catching the fender in event of a blowout.

Activity: Operating a bottom-dump truck.

Accident situation and occurrence: An employee was hauling material for an earthfill dam in a 100-ton bottom-dump truck. He hit a slick spot in the road which had just been watered under the dust abatement program, causing the truck to jackknife throwing the operator out of the cab. He received multiple injuries to his skull, collarbone, and ribs, resulting in 20 days of disability.

Cause determination and prevention: Several factors should be considered in this incident, such as (1) a dust abatement program

should be developed to provide the necessary moisture to arrest the dust but not create a hazardous situation, (2) equipment operators should use caution, slow down, and drive according to conditions, and (3) the truck was equipped with seatbelts although they were not being worn by the operator.

## HANDLING MATERIALS AND EQUIPMENT

Activity: Drilling holes with powered soil auger mounted on a pickup truck.

Accident situation and occurrence: An employee had drilled a hole for placing right-of-way monuments. With the drill stem extracted, he manually pushed it past vertical so that gravity and the hydraulic system would lower it into a horizontal position for transportation to a new location. Apparently while pushing, the employee twisted his body and sprained his lower back. The injury resulted in 5 days' disability.

Cause determination and prevention: The possibility of a bind in the fulcrum bearing was considered as well as a feedback in the hydraulic system. A check by a competent mechanic failed to reveal a mechanical fault. In order to avoid recurrence of this type of accident, a mechanical--rather than physical--means should be employed to lower the drill stem.

## HANDLING MATERIALS AND EQUIPMENT

Activity: Drill operator involved in core drilling operations.

Accident situation and occurrence: Employee was pulling throttle linkage to drill motor with motor running. Control cable caught on the universal joint pulling operator's right hand against the joint. The action tore off the tip of his right ring finger to the first joint. Injury resulted in 16 days' lost time.

Cause determination and prevention: Working on equipment without shutting off power. Could have been prevented if standard safety rules concerning working around or on rotating or operating machinery had been observed. The motor should have been shut off so that the drive shaft to the drill would not have been rotating under power.

\* \* \* \* \*

# FROM THE FIELD

Missouri-Oahe Projects Office, Huron, South Dakota: The following pictures depict the construction work being done by Reclamation contractors on the Transmission Division of the Bureau's Missouri River Basin Project. Bureau of Reclamation Photographs P466-600-408 A, P466-600-423 NA, P466-600-419 NA, and P466-600-421 NA.



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## BUREAU OF RECLAMATION NOISE CONTROL COURSE

On March 9, 1970, the Technical Engineering Analysis Branch completed presentation of a 40-hour, in-house, Noise Control Training Course. The course was sponsored by the Division of Design, Office of Chief Engineer, Denver, Colorado. Two 1-hour lecture sessions were held on Mondays, Wednesdays, and Fridays during the period from January 28, 1970, to March 9, 1970, and were attended by 31 Government employees, including participants from Geological Survey, General Services Administration, and the Bureau of Mines.

The course objective was to teach noise control techniques to a large segment of Reclamation's design staff. It has long been recognized that the most efficient and economical method of dealing with noise is at the design stage.

In August 1968, as a continuing effort in Reclamation's Noise Control Program, Reclamation held a 2-day Hearing Conservation Program for regional personnel. At that time noise exposure criteria were introduced and field personnel were trained to make sound level measurements. All Reclamation installations are regularly monitored for excessively high noise levels.

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## MOVIE ON CRANE SAFETY

A safety and training film aimed at reducing injuries in what historically has been one of industry's major injury areas is now available. "The Craneman" is a 23-minute-long color film produced at U.S. Steel's Geneva Works in Provo, Utah, following a year-long program of developing a training program for the crane industry.

Initially intended for Geneva's crane training program, it was subsequently made available to other U.S. Steel locations. Now, prints of the film have been offered to all companies using overhead traveling cranes.

The film is not intended to take the place of inplant or on-the-job crane training. Rather, it is offered as a supplement to such programs. The film demonstrates safety practices in the operation of overhead traveling cranes.

Prints may be obtained from: Supervisor of Training, Geneva Works, Post Office Box 510, Provo, Utah 84601.

Bureau of Reclamation offices can obtain this film on a loan basis from the Office of Chief Engineer, attention Code 841.

\* \* \* \* \*

# WATER SAFETY

Central Utah Projects Office, Provo, Utah--Central Utah Water Safety Council Honored: Recognition for outstanding service in promoting water safety was given the Central Utah Water Safety Council and its officers at a recent council meeting. Mr. Myron J. Fulrath, Chairman of the Water Safety Council, is shown in the first photo below (on the right) accepting the National Water Safety Congress "Presidential Citation" award from Mr. Palmer B. DeLong, Project Manager for the Bureau's Central Utah Projects Office. Mr. Fulrath was instrumental in the formation of the council and has been chairman of this organization for the past 2 years. The council was cited for the outstanding progress it has made in educating the public through the newspapers, television, and other news media.

In the second photo below, Mr. DeLong (right) presents the National Water Safety Congress "Certificate of Appreciation" award, issued in the name of the Central Utah Water Safety Council, to Mr. J. Earl Johnson, Vice Chairman (center) and Mr. L. Ted Menlove, Secretary.



Photo PX-418-22 NA



Photo PX-418-21 NA

South Platte River Projects, Loveland, Colorado--Operation Westwide: The Bureau's South Platte River Projects Office bused children, on an alternate basis, to attend the water safety meetings held in its office during May 1970.

Region 6 Regional Office, Billings, Montana, and North Platte River Projects, Casper, Wyoming--Water Safety Coloring Books: Good results were reported regarding the 5,000 copies of the water safety coloring books presented to children in the North Platte area. Mr. David Cunningham of the Region 7 Regional Office originated the coloring books, which were given wide distribution to school children by various offices throughout the Bureau of Reclamation. Region 6, Billings, Montana, reported that the coloring books were a tremendous success and that an excellent response was received from both parents and students.

Region 5, Amarillo, Texas--Recreational Facilities at Lake Meredith: The photograph on the following page shows a view of Lake Meredith, the marina, and recreational facilities, with Sanford Dam in the right background. These facilities, with the exception of the boat marina, were constructed by the Bureau of Reclamation for the Canadian River Municipal Water Authority and are administered by the National Park Service. The Park Service reported a total visitation of 1,266,173 for 1969, with the greatest water activity use being grouped as follows: 168,941 - boating; 79,611 - swimming; 32,530 - fishing; and 3,702 - water-skiing.

The National Park Service has been very active in educating the public concerning the U.S. Coast Guard regulations for pleasure craft. The basic boating rules and regulations are posted as follows:

1. Boats must be numbered according to State requirements.
2. Lights are required for nighttime operation.
3. All vessels must carry a Coast Guard approved life preserver in good condition for each occupant.
4. Inboard motorboats must carry fire extinguishers.
5. Vessels less than 26 feet in length must be equipped with oars and a bailing bucket.
6. All enclosed compartments must be ventilated.



One of the many Park Service patrolmen may board a boat to perform an inspection while persons are engaged in water activities. They also offer an inspection of the boat prior to its being placed in the water.



Photo P662-500-484 NA



Yuma Projects Office, Yuma, Arizona--Yuma Area Water Safety Council: Meetings of the Yuma Area Water Safety Council were held during April and early May for the purpose of formulating and implementing an effective water safety program. Plans were finalized for the preparation of a completely new water safety pamphlet, and ideas for a poster were considered. Messrs. Robert K. Leinbach and James G. Porter, President and Vice President, respectively, of the Yuma Area Water Safety Council, and W. E. Barcus, Jr., Yuma Projects Office Safety Officer, attended the meetings.

Mr. Neal Bear, Art Department, Arizona Western College, Yuma, was instrumental in the design and layout of the new pamphlet. Miss Donalyn Fram, student at Arizona Western College, drew the illustrations under the direction of Mr. Bear.

A poster was designed to depict a drowning in a local canal. Youngsters volunteered for the photograph on the poster, and the local ambulance service offered its equipment and drivers to authenticate the scene. The photograph was taken by the Yuma Projects Safety Officer. A reduced sample of the poster is inserted on the following page.

Twelve thousand pamphlets and 300 posters were printed by a local Yuma printer. Seven irrigation districts within the area shared the costs of printing.

The posters were distributed throughout the Yuma and surrounding areas. Members of the Water Safety Council and volunteer Boy Scouts distributed approximately 250 posters to drugstores, markets, beauty salons, general merchandising stores, etc.

The Yuma Projects Safety Officer distributed approximately 10,000 pamphlets and 115 posters to elementary grade schools and water districts.

---Here is a real example of community effort and cooperation toward a more safe environment.  
People will still "get involved" -- even in 1970!---







**WHAT  
YOU  
SEE  
IS  
YOUR  
OWN**

# RECORD OF PUBLIC DROWNINGS

January 1, 1970, through June 30, 1970

## Bureau-operated Facilities:

Canals	16
Reservoirs	<u>-</u>
Total	16

## Facilities Operated by Others:

Irrigation and Water Districts	9
State or County (Recreational)	<u>19</u>
Total	28

## Summary of Total Drownings During Period:

### By Operating Agency:

Bureau of Reclamation	16
Irrigation and Water Districts	9
State or County (Recreational)	<u>19</u>
Total	44

### By Type of Facility:

Canals	24
Reservoirs	<u>20</u>
Total	44

### By Activity:

Swimming	10
Boating	9
Fishing	3
Fell into water	8
Other	<u>14</u>
Total	44

### By Age:

Under 12 years of age	9
From 12 to 25	17
From 25 to 50	11
Over 50 years of age	<u>7</u>
Total	44

\* \* \* \* \*



# VEHICLE SAFETY

Region 3, Boulder City, Nevada--Defensive Driver Refresher Course: A total of 351 employees in Region 3 completed a 4-hour refresher course in driver education and training during the first 6 months of 1970. The color film, "The Smith System of Space Cushion Driving," which runs about 18 minutes, is shown at the conclusion of the course.

## FOOD FOR THOUGHT

If everyone who drives a car would lie a month in  
bed,  
With broken bones and stitched up wounds, or  
fractures of the head,  
And there endure the agonies that many people do,  
They'd never need preach safety any more to me  
or you.

If everyone could stand beside the bed of some  
close friend,  
And hear the Doctor say, "No hope," before that  
fatal end,  
And see him there unconscious, never knowing  
what took place,  
The laws and rules of traffic I am sure we'd soon  
embrace.

If everyone could meet the wife and children left  
alone  
And step into the darkened home where the sunlight  
shone,  
And look upon the vacant chair where Daddy used  
to sit,  
I'm sure each reckless driver would be forced to  
think a bit.

If everyone who takes the wheel would say a little  
prayer,  
And keep in mind those in the car depending on  
his care,  
And make a vow, and pledge himself to never take  
a chance,  
The great crusade for safety then would suddenly  
advance.

--Author Unknown

## DRINKING AND DRIVING

--Excerpted from National Safety  
Council publications

### Sobering Thoughts

The "1968 Alcohol and Highway Safety Report," completed for the U.S. Department of Transportation, summarizes for the first time the magnitude of the highway havoc involving drivers and pedestrians who have been drinking immoderately, together with facts about the effects of alcohol on the human body that are not widely known:

1. The amounts of alcohol that have been consumed by the drivers and pedestrians who cause crashes in which alcohol plays a role are usually far greater than the amounts ingested by moderate drinkers.
2. People arrested for drunken driving typically are not drinkers who have had only a couple of drinks.
3. Some such drivers are teen-agers and social drinkers who have been drinking abusively. But many--probably a majority of such drivers--are alcoholics.
4. Alcoholic drivers typically are not skid-row bums. They may be employed in respectable jobs, and often aren't even known to their intimates as problem drinkers.
5. Crashes caused by drivers who have been drinking heavily tend to be exceptionally violent, and are often fatal.
6. No other drug, including coffee, can reverse the effects of alcohol--itself a drug--on the brain. Coffee, tea, milk, and soft drinks are desirable substitutes, not antidotes.

The report also states that about half of the approximately 56,000 highway deaths that occur annually in the U.S. result from crashes involving the abusive use of alcohol. One medical examiner has estimated that 44 percent of the drivers killed were innocent victims of drunken drivers. Studies indicate that heavy-drinking drivers number only between 1 and 4 percent of those on the roads, yet account for nearly half of the nation's highway deaths.

### It's Up to You

The law can't regulate your drinking. It can only penalize you if you drive after drinking too much--often after innocent people have

died. All states now use chemical tests to determine blood-alcohol concentration. Under the law of many states you are presumed too intoxicated to drive at 0.10 percent. Other states have slightly higher levels and one sets it lower at 0.08. A presumptive level of 0.15 percent, considered too high in the light of recent studies, is still retained by a majority of states. An Indiana University study found that at 0.15 the chances of being involved in a traffic accident are 25 times greater than with no alcohol.

If you are going to drive, it would be better if you didn't drink anything at all. Or drink in such a manner that you will not be under the influence when you drive a car. Those are your only reasonable alternatives--If you choose the second, wait at least one hour per average drink before driving. That's the minimum amount of time required by the body to rid itself of alcohol. Black coffee, cold showers, fresh air or other folklore remedies will not speed things up one bit. They may make you a wide-awake drunk, but you're still just as impaired as far as driving is concerned. It might be better to go to sleep. It's up to you.

\* \* \* \* \*

### WANTED!

I have a personal interest in two of the forty-three million kids headed for school this fall.

I WANT these kids because they are my kids.

I WANT them because I love them and want to see them grow up, get an education, and live happy and useful lives.

I have learned that more children are killed in accidents than by all diseases combined. In fact, in an average year, 2,200 child pedestrians will be killed by automobiles.

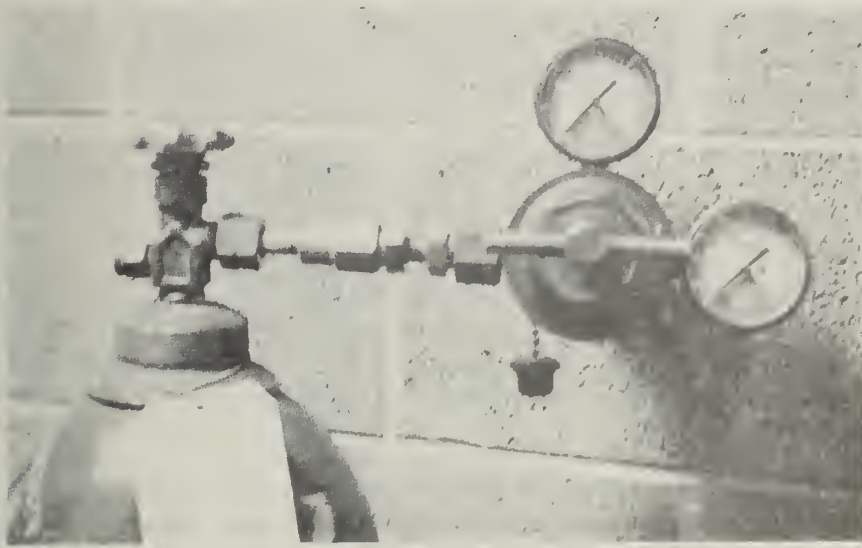
We all know that children lack the experience needed to know automatically what to do in an unexpected situation. I plead with you to keep this in mind when you drive. I am going to do everything I can to teach my kids to cross streets at the crosswalk, not to run from behind parked cars, or to play in the streets. But just remember, Mr. Motorist, we were all kids once and in spite of all our well-intentioned training, KIDS WILL BE KIDS! I plead with you, Mr. Motorist, to do your part in watching out for my kids.

--A Parent

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## BEWARE THE ABOMINABLE ADAPTER!

--Reprinted from Research and Development  
Section Safety Newsletter, June 1970, with  
permission of the National Safety Council



If any of your compressed gas cylinders look like this when the regulator is connected, you may be setting the scene for serious trouble. This article tells how the problem was handled by one company.

Throughout the company, many laboratories and production areas use compressed gas cylinders. The most common device used to reduce pressure to a safe value for non-liquefied gas removal is an automatic pressure regulator. It consists of a spring (or gas) loaded diaphragm which controls the throttling of an orifice. Delivery pressure will exactly balance the delivery pressure spring.

If the wrong regulator is used on a compressed gas cylinder, a serious accident can occur. The only way that a proper connection can be made is by using adapters.

The American National Standards Institute B57.1-1957 states, "In the standardization of compressed gas valve outlet connections, more than one outlet is provided for some gases. To provide interchangeability of equipment for the same gas, adapters may be required." According to George Pinney, National Cylinder Gas Division of Chemetron Corporation, "Left hand threads are reserved for flammable gases and right hand threads for nonflammable gases. There are a few exceptions. In the ANSI Standard B57.1, there are 38 connections listed, classified into four thread divisions: left and right hand threads and internal and external threads, plus some pipe threads and yoke type connections.



The various gases are assigned to connections, so that hazardous interconnections cannot be made."

To illustrate the hazard involved, the foregoing photograph shows an oxygen regulator connected to a hydrogen cylinder by the use of several adapters. If this combination were used, no immediate problem would be apparent. Hydrogen, however, is an oil-pumped gas, and oil film may develop within the oxygen regulator. If someone should then attach the oxygen regulator to an oxygen cylinder, a fire or explosion may occur.

Looking at this combination closer, let's attach a hydrogen regulator to an oxygen cylinder. Oil is used to lubricate gauges on some flammable gases, such as hydrogen. Oxygen under pressure will explode violently when it comes in contact with an oxidizable material, such as oil. The combination of a compressed gas cylinder of oxygen used with a flammable gas regulator could be disastrous.

What, then, can be done about the possibility that some day, sometime, a hazardous interconnection will be made? The answer--OUTLAW THE ADAPTER!

Due to the use of a wide variety of toxic and flammable compressed gases, the Research, Development and Control Safety and Health Committee reviewed this problem. A recommendation was made by the committee to discontinue the use of adapters.

Storeroom personnel were assigned the responsibility of replacing adapters with the appropriate fittings according to ANSI Standard B57.1. The photograph below shows some of the adapters and connections which have been removed since the program began.

It is possible that a change in compressed gas cylinder suppliers may necessitate a change in the present procedure. If, however, the central control of regulator to cylinder connections prevents one injury, it will be worth the effort expended.



\* \* \* \* \*

## THE DELAYED DEMISE OF LEADED GASOLINE

- Reprinted by special permission from Consumer Bulletin, May 1970, Copyright 1970 by Consumers' Research, Inc., Washington, New Jersey 07882; all rights reserved.

Automobile engines designed to run on lead-free gasoline are expected to be available on many 1972 model cars and even on some earlier models. That announcement was made by Transportation Secretary John Volpe in the middle of February 1970 after he had made a 2-day tour of research facilities at General Motors, Ford, and Chrysler. The change has been a long time coming.

Back in January 1932 (and in an earlier Bulletin), we warned that there were health hazards involved in handling leaded fuel or in breathing the exhaust gases from cars burning such fuel. (In factory production of ethyl fuel, there were a number of deaths from poisoning.) We also pointed out that in France and its colonies, the use of ethyl gasoline was forbidden, even in regions where concentration of automobiles was exceedingly small. That was over 40 years ago, and the dangers have mounted steadily since as the volume of sales increased and the addition of tetraethyl lead to all grades of gasoline became the general practice.

Since it was cheaper to ethylize gasoline as a means of raising octane ratings (to improve power and prevent engine knock) than to employ more costly refining techniques, the use of tetraethyl lead in gasolines, beginning in 1923, was widely promoted. Consumers were persuaded that leaded gasoline was to be preferred to the non-leaded type.

At one time Sun Oil Co., as well as the American Oil Co., marketed fuels that were lead free. But at the time of Secretary Volpe's announcement, American Oil Co., a subsidiary of Standard Oil Co. of Indiana, was the only company that sold a lead-free gasoline and gasoline of this grade accounted for only about 20 percent of the company's sales.

Back in August 1957, we called attention to studies of the air of certain cities in Switzerland that showed the lead content at some points was 5 to 7 micrograms per cubic meter. This was lower than the levels found in some United States cities, but high enough to move some European authorities to urge that the addition of tetraethyl lead to gasoline should be discontinued. As Dr. Norman Hilberry, then director of the Argonne National Laboratory, put it, tetraethyl lead from auto exhausts may be a greater cause for concern than the fallout from nuclear bomb testing.

In earlier days it was often possible to run an automobile satisfactorily on regular-grade gasoline without serious pinging or knocking of the engine and back in the 1950's such gasolines were often lead free. Unfortunately for consumers it became standard practice for car makers to gain extra power by developing models with high-compression engines that, to run smoothly, required gasoline of the highest attainable octane rating. The easiest and cheapest way to obtain this octane level was the addition of tetraethyl lead.

As this practice became universal, it was no longer necessary for Consumers' Research to rate gasolines, for the differences in performance between most well-known brands was so slight that the car owner could rarely detect any practical difference in their performance in his car - unless it had a high-compression engine designed to work satisfactorily only on one of the high-octane premium gasolines.

Since it is apparently generally agreed that leaded gasoline will be off the market in a couple of years, the past record of its hazards to health may be largely of historical interest. We discussed the subject at some length in an article in Consumer Bulletin, February 1967, on the growing dangers of lead poisoning.

As we pointed out, one of the most significant studies to alert the public health officials to the dangers of gasoline containing tetraethyl lead was a report by Dr. Clair Patterson, geochemist of the California Institute of Technology, published in a leading medical journal, that the level of lead in the blood of the average American had risen to almost half that which produces recognizable symptoms of ill health. That figure is of course much too high for safety.

Dr. Patterson's findings were so impressive and so widely quoted in the scientific press that it was not surprising to find the United States surgeon general in 1966, nearly a year later, taking the public position that one of the major threats to health was the increasing amount of lead that is contaminating the atmosphere, largely as a result of its use as an anti-knock compound in gasoline.

Furthermore the National Academy of Sciences reported that transportation is responsible for 59.9 percent of air pollution in this country, which placed a pretty large burden on automobile manufacturers and the oil companies to apply their highly developed



technical resources toward achieving an acceptable solution. That they are at least thinking seriously about this problem was indicated in a speech early this year by Edward N. Cole, president of General Motors, who is also an automotive engineer. Mr. Cole pointed out that, although the use of tetraethyl lead had made a significant contribution in previous years to increasing the efficiency of the internal combustion engine, its use must be reevaluated in the light of the increasingly serious problems of air pollution. He also conceded that there were certain potential gains in the omission of tetraethyl lead from gasoline: in addition to reduction of pollutants, long-life exhaust catalytic converters to reduce contamination of the air by certain combustion byproducts would become technically feasible; exhaust manifold reactors would have increased life; and so would exhaust gas recirculation systems to control oxides of nitrogen. In this connection, it is interesting to note that researchers for Ford Motor Co. contend that leaded gasoline leaves deposits inside automobile engines that cause greater emissions of unburned fuel, a major cause of smog.

Some gasoline company executives have already gone on record as ready and able to produce unleaded fuel, though at an increased price per gallon. The Standard Oil Co. of California, the Gulf Oil Corporation, and Atlantic Richfield Company all report that if the automobile companies build engines with the proper engine compression ratios, they will come up with non-leaded gasolines in short order. No doubt others will promptly follow in their footsteps as the necessity becomes evident.

We congratulate President Nixon on his insistence that air pollution from automobiles must be eliminated and Secretary Volpe's prompt attention to laying the foundation for a timetable to implement the technical changes involved. It seems to us a pity that leaded gasoline had to be proved to be a major hazard to health in the United States before the best brains in the industry looked into the technical problems involved in making do without it. Only recently, for example, it has been reported that something like 400,000,000 pounds of lead from automobile exhausts had been diffused per year over the whole landscape, on lakes and rivers and fields of growing grain and produce, and even on the snows of remote western mountain areas.

From 1932 when we issued a clear warning of the danger from tetraethyl lead to 1972 when the industries involved will have finally faced the need for making the necessary adjustments in manufacturing and refining requirements for producing an efficient fuel is too long a period for the health and welfare of United



States consumers to be jeopardized. The U.S. Public Health Service has not shown any great awareness of the dangers in the field until recently.

There has been much talk about the concern of the younger generation with matters of social welfare. Perhaps the current crop of chemists, toxicologists, geneticists, and engineers will show more forethought than federal and state governments have in evaluating the effects on health and well-being of the processes and devices they are inventing or improving so that the next generation will not be exposed to something paralleling the hazards of tetraethyl lead gasoline, for the past 40 years.

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## HEAD RESTRAINTS

When it comes to head restraints, the National Safety Council advises that most drivers don't use their heads.

Automobile head restraints, standard equipment on all cars built after January 1, 1969, can prevent serious neck injuries in rear-end collisions--providing they are properly adjusted.

Unfortunately, the Council notes, most persons driving cars equipped with adjustable head restraints are either adjusting them improperly or not at all. The Council therefore makes the following suggestions:

Ideally, the head restraint should be positioned from one to six inches from the person's head.

An adjustable restraint should be set so that the top of it is no lower than the top of the occupant's ears. (In this way, the restraint is high enough to support the head, instead of jarring the neck, in case of impact.)

\* \* \* \* \*

## POWER MOWERS TAKE MOUNTING INJURY TOLL AMONG SUBURBANITES

Rotary Type Can Slash Feet, Fling Debris;  
Industry Says It has Tightened Standards

- By Jonathan R. Laing  
Reprinted with permission  
from The Wall Street Journal  
(Issue of May 14, 1970)

Harold Mattson admits that the lawn in front of his Crystal Lake, Illinois, home isn't the best groomed on the block. "I don't mow it frequently enough because I dread using my power mower," he explains.

The salesman's fear is well founded. Four summers ago he had one toe cut off and two badly mangled by his power mower. The mishap occurred when the machine rolled down a slight incline and over his foot after he stepped in front of it to clear away some debris.

Mr. Mattson's type of accident isn't uncommon. Statistics are fragmentary, but the U.S. Department of Health, Education and Welfare recently estimated that 140,000 persons were injured by power mower mishaps in 1968 alone. Observers say the toll is rising annually as the suburbs expand and more Americans come to regard power mowers as labor-saving necessities. About 37 million power mowers, ranging from \$50 push models to elaborate, \$1,200 rider mowers, ply United States lawns today, nearly double the total of just 8 years ago.

Many mower-caused injuries are severe. Amputations and blindings are not unusual, and there have even been a few fatalities. For example, Louise Kiefer of O'Fallon, Illinois, was fatally injured in her kitchen last summer by a 6-inch chunk of her husband's power mower blade that smashed through an aluminum storm door and caromed off a wall before striking her.

### Survey Points Up Problem

Indeed a survey of insurance company liability claims by the National Commission on Product Safety, created by President Johnson to study the hazardousness of various consumer products, last fall revealed that power mowers cause more seriously incapacitating injuries than any other household product or appliance.

"No single household product holds such potential for human destruction as the power mower," states Sen. Warren G. Magnuson, chairman of the Senate Commerce Committee, who has written widely on consumer topics. The power mower industry itself acknowledges that its products can be dangerous, though it says it has done much to promote safety in recent years.

Experts put most of the blame for mower accidents on the rotary mower, which accounts for over 90 percent of industry sales. It has a double-edge blade that whirls inches above the ground: the tips of the blades move more than 200 miles an hour. The rotary is popular because it is usually cheaper than the reel power mower (a motorized version of the old push mower) and can cut all grass lengths: reel models often don't work well in high grass.

The swift, scythe-like blade makes the rotary hazardous. "Almost any contact with a rotary results in a smashing and shredding of bones and tissues because of the many passes the blade inevitably makes before the hand or foot can be withdrawn," says Dr. Abraham B. Bergmen, a Seattle physician who has treated a number of mower injury victims and who participated in a Seattle-area survey of mower injuries in 1964.

### Like a Bullet

Also, rotary blades can hurl debris found on lawns with bullet-like force. In a test run by Consumers Union, a nonprofit organization that evaluates consumer products, a power mower flung a bolt through a steel car door 50 feet away.

Mower accidents frequently occur in other ways, too. As Mr. Mattson learned, the machines can be dangerous on inclines. Though Mr. Mattson was injured when he got in front of his mower as it rolled down a slope, accidents also can happen when the operator is behind the mower. Former major league baseball pitcher Curt Simmons and Sen. Birch Bayh both lost parts of their toes when they pulled mowers over their feet while mowing on inclines. Still other accidents occur when operators carelessly reach into the discharge chute, where clippings are expelled, to unclog the opening while the machine is still running.

Some experts insist that the design of many mowers contributes to mishaps. According to Bertram Strauss, chief of special projects for Consumers Union, many current models have too much blade exposure, excessive blade speed, and unsafe discharge chutes. The National Commission on Product Safety, which delivers its final

report next month, is expected to include power mowers among a list of products that should be Federally regulated.

The industry, through its trade group, the Outdoor Power Equipment Institute (OPEI), says that since 1960 it has sponsored increasingly stringent safety standards for mowers. For instance, the standards require mower blades to be completely shielded except in front and at the discharge chute. In addition the OPEI has mounted a consumer education program including radio and television spots to inform users of the hazards of mowers.

Critics of power mowers claim that the standards are sometimes ignored by the industry. An investigator for the National Commission on Product Safety testified at a commission hearing that when he checked power mowers last summer he found 25 percent of those bearing OPEI safety seals failed to conform to the standards.

Officials of the OPEI subsequently admitted to the commission that seals are sent to any manufacturer who certifies that its machines meet the standards. Stung by criticism, the OPEI has since agreed to begin independent laboratory testing of power mowers after June 30, 1970.

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## DECORATING OF EAR MUFFS KILLS SOUND PROTECTION

Airline ground personnel are endangering themselves by decorating their ear muffs with small decorative air-transport items such as junior-pilot wings, according to Bernard M. Kipikas, editor of the National Safety Council's Air Transport Newsletter.

These items are attached by drilling the cup of the ear muff and securing the decoration in place with a clip or similar device.

The danger results because the drilling of a hole in the ear muff causes a reduction in attenuation--the muffling of excessive noise.

Airline personnel have also been guilty of wearing their over-the-head ear muffs in an inverted position--with the head-band under the chin. This practice provides additional comfort to the worker, but increases the risk to the wearer.

\* \* \* \* \*



DAMS: GOOD, BAD?  
SEE ENTIRE PICTURE

--By Dick Prouty,  
Denver Post Staff Writer  
Reprinted with permission from  
the Denver Post

It's become popular to damn dams because they change the environment, especially the environment of trout fishermen whose favorite waters perish by inundation.

But environment is more than just one view. By definition it's the whole ball of wax, tangible and intangible. And in view of the whole picture, the loss of some 243 miles of Colorado trout stream fishing is more than offset by gains to mankind in other areas because dams were built and waters backed up.

There are some 1,800 man-made ponds, lakes and reservoirs sprinkled like jewels of life from Colorado's sun-drenched prairies to the cool shade of Grand Mesa. In each case a new environment, a different ecology succeeds the old.

The Colorado Game Fish and Parks Department estimates another 216 more miles of trout stream will be lost in the next two decades as new dams are erected and waters held back. So the dam building isn't over.

What's obtained when the waters are damned?

Countryside is gouged out, trees are felled in many cases, construction roads are built, and the scene is changed as the dams are in the making.

But on completion the projects mean water, without which there would be no cities, industries, farming. Some of them mean electric power, autumn and winter duck hunting, winter ice fishing, summer fishing, sailboating, swimming and as waters are used for irrigation, hunting for pheasants, quail and deer ... all because of year-around water.

The impact on land values--look at the growth of the Dillon area, around Gunnison, the yet-to-be Pueblo Reservoir--employment, and even water pollution is tremendous. Streams that would trickle foul smelling at the end of summer now dilute sewage because they

flow all year around as water is released from behind stone and earthen walls.

And back to fishing, for a moment. There's a variety of game fish in Colorado, not just trout. The joy of fishing comes from crappies, pike, bass, bluegills, perch and even the scorned carp that thrive in the warmer man-made lakes.

And how about posting? Yes, posting those stream banks so only those with cash for leasing can fish from them. It's becoming increasingly prevalent and big groups with big money like the American Sportsman's Club--\$750 to join--are saying to the week-end picnickers and sometimes fishermen: "Pay up or stay out." And that includes water fowl hunting, too.

But you and I paid for the damn dams and, by golly, we can use 'em for a \$10 bill to offset some of the maintenance costs. (The bill for vandalism in the national forests in 1969 was \$2 million, according to the Public Land Law Review Commission report).

(And taxpayers, how do you justify or even excuse that kind of environmental pollution?)

Just try fishing some of those prime waters--the Gunnison, the South Platte, the Roaring Fork, the Fryingpan. The signs are there and the guy who has paid to perform as Izaak Walton doesn't take kindly to trespassers.

Denver Research Institute studies have shown the tax and income losses from building Lake Granby and inundating acres of prime meadow land is between \$40,000 and \$50,000 a year.

The benefits amount to more than \$800,000 annually ... with fishing considered on both sides of the equation.

The annual impact at Shadow Mountain-Granby and Horsetooth Reservoirs of the Big Thompson Project is calculated at more than \$4.8 million. Of this \$532,000 is boating business. It isn't mentioned, but presumably some boaters also fish.

The job associated with the new Eastman Kodak factory near Windsor are attributable to the electric power and the water possible because of the project.

Fishing is big in Colorado reservoirs operated by the Bureau of Reclamation. More than 2 million legal size fish were caught in one year recently--current figures aren't available. Duck hunting has been stimulated and government financed research projects are under way to find the best management programs to improve the recreation and fishing where reservoirs now cover once magnificent trout streams.

Releases of water from the reservoirs are coordinated through state and federal game and fish agencies.

The mighty Rio Grande along with others go dry. But there is no reservoir on the Rio Grande to save water for release in water-short years to keep down-stream fish alive.

When the Big Thompson Project of the Colorado River, which created Lake Granby and Shadow Mountain and 14 other storage reservoirs was completed in 1959 more than a half dozen natural stream flows were disturbed.

Yet that water is used for a playground that attracted more than a million urban weary Americans last year.

It's six power plants mean jobs, television in homes--even the homes themselves. And there isn't a pall of air pollution or fear of radioactive contamination from power generated by damming up streams and using the accumulated water to generate electricity.

The agricultural tab from the Big T is a \$64-million-a-year credit.

And the Big T is only one major reservoir development ... The Curecanti on the Gunnison, which affected some 50 miles of that prime trout fishing stream, Dillon Reservoir on the Blue River and scores more.

Perhaps the major debit against such projects is that they bring more people and fishermen to Colorado.

Perhaps Colorado is a better place to live because of the damn dams. Certainly most of us wouldn't be here without them.

Research to take water from various depths of reservoirs, of modifying the release mechanism, are aimed at improving the lot of the down stream fisherman.

Much the same cries of ruined fishing accompanied the building of the mighty Tennessee Valley Authority 30 years ago. But those eastern reservoirs are now renowned as recreation and fishing paradises because fish management learned to capitalize on them, not bemoan them.

What this adds up to, overall, is a better way of life--a better environment.

Nature is always changing things. So is man. But nature heals and in time new trees green where loggers scarred and ecological cycle moves on.

The ill will that comes to dam builders is often earned. The plans have no public input until they're all made. People, such as Jack and Mildred Janowitz, who saw their life's work in a beautiful and treasured ranch gobbled up for Chatfield Reservoir, are understandably bitter and one begins to feel that nothing is sacred.

And some dams, like the ones proposed on Fountain Creek above Pueblo, and some projects, like channelization of the Arkansas River--both Army Corps of Engineers proposals--ought to be damned.

The point made here, hopefully, is to look at the entire picture, "the total environment." Change isn't always bad. There are many publics. Not all of them can be pleased.

"It's all that the young can do for the old, to shock them and keep them up to date."--George Bernard Shaw.



# SAFETY PERFORMANCE RECORD

## CUMULATIVE QUARTERLY REPORT

### GOVERNMENT FORCES

2nd QUARTER, 1970

PERIOD FROM JANUARY 1, 1970 THROUGH June 30, 1970

REPORTING OFFICE	NUMBER OF EMPLOYEES	MAN HOURS		DISABLING INJURIES		DAYS LOST	FREQUENCY RATE	SEVERITY RATE
		CUMULATIVE THIS YEAR	CUMULATIVE THIS YEAR	FATAL *	CUMULATIVE THIS YEAR	CUMULATIVE THIS YEAR	CUMULATIVE THIS YEAR	CUMULATIVE THIS YEAR
Washington Office	310	303,068						
Denver Office	1,297	1,330,628						
REGION 1								
Boise Regional Office	176	148,487	3		135	20.2	909	
Central Snake Project	39	36,311						
Chief Joseph Dam	25	32,722						
Columbia Basin Project	312	481,064						
Grand Coulee Dam Operations	310	154,194						
Green Springs Powerplant	2	2,058						
Hungry Horse Project	47	41,009						
Lower Columbia Development Office	55	51,488						
Lower Teton Project Office	11	7,310						
Minidoka Project	69	72,474						
Snake River Development Office	54	51,236						
Third Powerplant Construction Office	212	183,472						
Upper Columbia Development Office	46	44,015						
Yakima Project	34	28,560						
Totals & Averages	1,396	1,334,410	3		135	2.2	101	
REGION 2								
Sacramento Regional Office	541	605,053						
Regional Drill Crew	39	42,200						
Auburn-Polans South Unit	210	215,382						
Cachuma Operations Field Branch	2	2,016						
Central Coast Development Field Branch, Santa Barbara	4	3,952						
Fresno CVP Construction Office	130	128,934						
Fresno Field Division	142	143,448						
Polans Field Division	77	78,204						
Klamath Project Office	20	17,750						
Lahontan Basin Projects Office	26	32,528						
Mapa Development Field Branch	1	1,504						
Sacramento Valley CVP Construction Office, Willows, California	124	115,656	1		5	8.6	43	
San Luis Unit CVP Construction Office	60	67,366						
Shasta Field Division	141	143,613						
Solano Operations Field Branch	3	2,864						
Tracy Field Division	165	167,535						
Upper North Coast Development Field Branch, Butte		2,496						
Totals & Averages	1,705	1,771,501	1		5	0.6	3	
REGION 3								
Boulder City Regional Office	223	191,350						
Boulder Canyon Project	162	149,104						
Dixie Project Office	9	7,395						
Lower Colorado River Project	207	184,635						
Parker-Davis Project	345	354,441						
Phoenix Development Office	90	86,080	1		1	11.6	12	
Southern California Dev. Office	29	19,686						
Southern Nevada Water Project	104	92,897	1		33	10.8	355	
Yuma Projects Office	142	129,120						
Totals & Averages	1,311	1,214,718	2		34	1.6	28	
REGION 4								
Salt Lake City Regional Office	199	207,074						
Central Utah Projects	189	179,343						
CHSP Power Operations Office	265	252,268						
Current Unit, Montrose, Colorado	77	73,073						
Durango Projects Office	27	29,429						
Grand Junction	51	50,964						
Logan Development Office	5	5,160						
Utman Project Office	21	20,125						
Upper Green River	22	18,852						
Totals & Averages	856	832,288						
REGION 5								
Amarillo Regional Office	100	95,917						
Albuquerque Development Office	33	34,575						
Austin Development Office	41	43,512						
Lower Rio Grande Project	1	1,032						
Middle Rio Grande Project	211	233,615	4		120	17.1	514	
Navajo Project	73	74,624						
Oklahoma City Development Office	20	17,417						
Pecos River Office	17	24,743						
Rio Grande Project	207	210,757						
San Juan-Chama Project	64	71,266						
Totals & Averages	767	797,458	4		120	5.0	150	
CONSOLIDATED TOTALS								
TOTALS LAST YEAR (19 )								

\*FATALITIES INCLUDED IN TOTAL DISABLING

# SAFETY PERFORMANCE RECORD

## CUMULATIVE QUARTERLY REPORT

### GOVERNMENT FORCES

2nd QUARTER, 1970

PERIOD FROM JANUARY 1, 1970 THROUGH JUNE 30, 1970

REPORTING OFFICE	NUMBER OF EMPLOYEES	MAN HOURS	DISABLING INJURIES		DAYS LOST	FREQUENCY RATE	SEVERITY RATE
		CUMULATIVE THIS YEAR	CUMULATIVE THIS YEAR	FATAL %	CUMULATIVE THIS YEAR	CUMULATIVE THIS YEAR	CUMULATIVE THIS YEAR
REGION 6							
Billings Regional Office	153	144,480					
Geology and Drill Crews	11	10,086					
Canyon Ferry Project	21	17,982					
Fort Peck Project	41	37,267					
Missouri-Oahe Projects	203	209,440					
Missouri-Souris Projects	170	106,390					
Power System Operations Office	51	53,040					
Riverton Project	4	3,787					
Upper Missouri Projects	57	57,738					
Yellowtail Project Office	40	38,614					
Totals & Averages	951	878,764					
REGION 7							
Denver Regional Office	183	177,232	1		12	5.6	68
Fryingpan-Arkansas Project	174	149,712					
Glen Elder Unit	18	25,392					
Kansas River Projects	111	102,000					
Niobrara-Lower Platte Dev. Office	30	30,240	1		60	33.1	1,984
North Platte River Projects	229	237,200	2		35	8.4	148
South Platte River Projects	161	156,520					
Totals & Averages	906	878,296	4		107	4.6	122

# SAFETY PERFORMANCE RECORD

## CUMULATIVE QUARTERLY REPORT

### CONTRACTOR FORCES

2nd QUARTER, 1970

PERIOD FROM JANUARY 1, 1970 THROUGH June 30, 1970

REPORTING OFFICE	NUMBER OF EMPLOYEES	MAN HOURS	DISABLING INJURIES		DAYS LOST	FREQUENCY RATE	SEVERITY RATE
		CUMULATIVE THIS YEAR	CUMULATIVE THIS YEAR	FATAL *	CUMULATIVE THIS YEAR	CUMULATIVE THIS YEAR	CUMULATIVE THIS YEAR
REGION 1							
Chief Joseph Dam Project	7	9,767					
Columbia Basin Project	28	87,176	3		26	34.4	298
Lower Teton Project Office	8	2,210					
Missidoka Project		2,097					
Third Powerplant Construction Office	751	640,066					
Yakima Project	5	872					
Totals & Averages	801	742,488	3		26	4.0	35
REGION 2							
Auburn-Polsom South Unit	169	60,786	1		14	16.4	230
Fresno CVP Construction Office	23	31,926					
Fresno Field Division		1,842					
Lahontan Basin Projects Office	5	5,643					
Sacramento Valley CVP Constr. Office	169	93,270					
San Luis Unit CVP Construction Office	18	35,623					
Tracy Field Division	7	294					
Totals & Averages	331	229,384	1		14	4.4	61
REGION 3							
Boulder Canyon Project		584					
Lower Colorado River Project	2	16,728					
Parker-Davis Project	10	48,468					
Southern Nevada Water Project	247	238,292	2		19	8.4	80
Yuma Projects Office	32	12,163					
Totals & Averages	291	316,195	2		19	6.3	60
REGION 4							
Salt Lake City Regional Office	15	1,080					
Central Utah Projects	155	109,403					
CECP Power Operations Office	1	88					
Curecanti Unit	111	74,605	1		7	33.4	94
Lynasa Project	24	3,839					
Upper Green River	3	972					
Totals & Averages	309	189,987	1		7	5.3	37
REGION 5							
Navajo Project	11	7,368					
Pecos River Office		3,624					
Rio Grande Project		1,421					
San Juan-Chama Project	383	347,639	2		120	5.8	345
Totals & Averages	394	360,052	2		120	5.6	333
REGION 6							
Missouri-Cahoe Projects	82	160,438	1		25	6.2	156
Missouri-Souris Projects	161	71,045	2	1	6,001	28.2	84,468
Riverton Project	4	2,041					
Upper Missouri Projects		12,224					
Totals & Averages	247	245,548	3	1	6,026	12.2	24,441
REGION 7							
Fryman-Arkansas Project	120	61,049	4		32	65.5	524
Glen Elder Unit		11,225					
Kansas River Projects	42	20,779	1		2	48.1	96
North Platte River Projects	21	7,354					
South Platte River Projects	12	3,355					
Totals & Averages	195	103,762	5		34	48.2	328
CONSOLIDATED TOTALS							
	2,568	2,188,416	17	1	6,246	7.8	2,854
TOTALS LAST YEAR (1969)							
	3,264	6,298,647	72	3	20,250	11.4	3,214

\*FATALITIES INCLUDED IN TOTAL DISABLING





Not Only  
**UNLAWFUL.....**  
but also extremely  
**DANGEROUS!**



### 3 Collegians Electrocuted In Nebraska

NORFOLK, Neb. (AP) — Three students attending Northeast Nebraska College were killed Wednesday afternoon when a high voltage line fell across their automobile nine miles southeast of here.

A young woman escaped through a car window.

The dead:

Carolyn Osborn, 21, rural Norfolk, identified as the driver

Miles Patton, 20, Norfolk.

Donald Strate, 18, Hoskins, Neb.

The survivor was identified as Christie Graber, 19, Norfolk.

The state safety patrol said Miss Graber escaped because she jumped from a rear window without making contact with the car and the ground at the same time.

Investigators said at least one of the four students was shooting from the car at insulators on a high-voltage electric transmission line.

Authorities said one of the lines was pierced and it fell on the auto. It carried 7,200 volts.

They said when one man alighted from the car he caused a ground and the two others were electrocuted.

The car was destroyed by fire and the victims burned beyond recognition.

SAIR



# *Reclamation* **SAFETY** **NEWS**

THIRD QUARTER 1970



THE LIBRARY OF THE  
NOV 13 1970  
UNIVERSITY OF ILLINOIS  
AT URBANA-CHAMPAIGN

UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF RECLAMATION  
ENGINEERING AND RESEARCH CENTER

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Front Cover Photo: Regional Safety Engineer Frank J. Kouba, Boulder City, Nevada, is shown presenting the coveted "Award of Honor," from the National Safety Council to Regional Director A. B. West for Region 3's safety performance in 1969. Region 2, Sacramento, California, and Region 6, Billings, Montana, also won the National Safety Council's Award of Honor for their safety performance during 1969. Photo PX-D-67873

# BUREAU SAFETY PERFORMANCE

## 1970 CUMULATIVE ACCIDENT RECORD

January 1 - September 30, 1970

### A. GOVERNMENT FORCES

<u>Region</u>	<u>Injury index*</u>	<u>Frequency rate</u>	<u>Severity rate</u>	<u>Vehicle accident rate*</u>
Region 4	0.02	0.8	2	0.8
Region 6	0.3	2.3	11	2.1
Region 2	0.3	1.5	17	1.8
Region 3	1.0	1.6	65	1.7
Region 1	3.2	2.0	158	4.0
Region 5	4.8	3.4	140	2.3
Region 7	<u>5.7</u>	<u>4.4</u>	<u>130</u>	<u>3.1</u>
Totals to Date	1.1	1.8	60	2.2
<hr/>				
Totals 1969	10.7	1.6	671	3.1

\*Injury index is equal to frequency rate times severity rate divided by 100.  
Vehicle accident rate is the number of accidents per million miles driven.

### B. CONTRACTOR FORCES

<u>Region</u>	<u>Injury index</u>	<u>Frequency rate</u>	<u>Severity rate</u>	<u>Fatal injuries</u>
Region 1	0.5	2.5	21	0
Region 4	10.9	7.0	156	0
Region 5	13.6	5.4	252	0
Region 2	18.4	8.4	219	0
Region 7	22.1	18.7	118	0
Region 3	42.0	12.2	344	0
Region 6	<u>1,260.9</u>	<u>7.9</u>	<u>15,961</u>	<u>1</u>
Totals to Date	122.3	7.2	1,698	1
<hr/>				
Totals 1969	366.4	11.4	3,214	3

### C. RECLAMATION CIVILIAN CONSERVATION CENTERS

Frequency rate	0.6
Severity rate	11
Vehicle accident rate	16.7



# D. TEKTITE 2 PROJECT - ST. JOHN, VIRGIN ISLANDS

Man-hours	297,908
Disabling injuries	1
Days lost	39
Frequency rate	3.4
Severity rate	131

## LOST TIME ACCIDENT ANALYSIS

Government Forces - 1970  
Third Quarter

Cumulative to Date:  
September 30, 1970

### A. ACCIDENT CLASSIFICATION

<u>Description</u>	<u>No.</u>	<u>Days lost</u>
Lifting	4	101
Handling materials and equipment	4	36
Falls of persons	8	365
Struck by object	3	32
Vehicles	4	102
Machinery	1	180
Other	<u>1</u>	<u>28</u>
Total	25	844

### B. OPERATIONAL SUMMARY

<u>Operation</u>	<u>Man-hours</u>	<u>No. of accidents</u>	<u>Days lost</u>	<u>Frequency rate</u>	<u>Severity rate</u>
Administration, Clerical and Design	5,967,334	3	23	0.5	4
Construction	2,048,360	4	147	2.0	72
Investigation	1,569,491	7	176	4.5	112
Power O&M	2,987,626	5	285	1.7	95
Irrigation O&M	<u>1,563,680</u>	<u>6</u>	<u>213</u>	<u>3.8</u>	<u>136</u>
Totals	14,136,491	25	844	1.8	60

SAFETY is not a signal light, a jail sentence, a divided highway, or an enforcement index. SAFETY is primarily a state of mind, under which all people, realizing the consequences of accidents, are willing to accept those restraints necessary to prevent them.

\* \* \* \* \*

## SECRETARY ENCOURAGES INVOLVING YOUTH IN ENVIRONMENTAL PROBLEMS

--From remarks to the National Municipal  
League, Portland, Oregon

Secretary of Interior Walter J. Hickel urged Government officials to enlist the aid of the young because he has found that with the young "there are always new ideas poppin up, new ways of approach-  
ing old problems. "

Those who treat youth as a problem will discover they have to spend all their time on that problem, Hickel said. "But those who treat youth as the answer will find thousands of them working at their side to solve the real problems of our age. "

None of the problems of environment can be licked unless the people are motivated into caring, the Interior Secretary said. Personal involmment is the key, and "the 1970's must be spent more and more on natural beauty and those things which enhance the living of life. "

\* \* \* \* \*

## CONTRACT CONSTRUCTION ACCIDENT RATES

Contract construction had a frequency rate nearly twice as high as manufacturing. The frequency of injury increased slightly to 26.9 injuries per million employee-hours worked in 1968 from 26.7 in 1967. On the average, more than 5 employees of every 100 in contract construction were injured each year. The severity rate in contract construction declined to 1,992 days charged per million employee-hours worked in 1968 from 2,130 in 1967. However, this number represented a level nearly three times as high as that for manufacturing.

The increase of the frequency rate in construction in 1968 is a reversal of a declining trend over the past decade. The incidence of injuries generally has been declining since 1959 when the rate was 32.1. Although employment in contract construction has been rising over the past 10 years, there has been no corresponding growth in the injury-frequency rate, apparently because increased mechanization has partly eliminated many injuries that resulted from manual handling.

\* \* \* \* \*

# SAFETY AWARDS

Ray Kizer Construction Company and R. A. Heintz Construction Company

Pictured below and on page 5 is Mr. B. P. Bellport, Director of Design and Construction at Reclamation's Engineering and Research Center, Denver, Colorado, presenting Construction Safety Awards to Mrs. R. A. Heintz and to Mr. Ray Kizer. The contractors were honored by the Bureau of Reclamation at a ceremony held in Reno, Nevada, on July 24, 1970, for their outstanding safety record in the construction of Stampede Dam over a period of 3-1/2 years. Photo PX-D-67874





Representatives from the Bureau of Reclamation attending the luncheon for the Ray Kizer Construction Company and R. A. Heintz Construction Company included the following who are shown above, left to right: Messrs. B. P. Bellport, Fred Lasko, Jack D. Carter, "Robby" Robinson, Larry Thomas, H. Smith Richards, and R. W. Cary. Photos PX-D-67876 (top) and PX-D-67875 (bottom)



## SAFE DRIVER AWARDS - PUERTO RICO PROJECT

Pictured below are employees at Toa Vaca Dam who recently received Safe Driver Awards covering a total of 76 years of safe driving.



Shown above, left to right: William T. Pitchford, Thomas Dewhurst, Thomas Bixby, Thomas Cavin, Olin Gray, Robert Valentine and Martin Everson. Photo PX-D-67877

\* \* \* \* \*

# FROM THE FIELD

## REALISTIC APPROACH TO FIRST AID REFRESHER TRAINING

Recently the Minidoka Field Branch, Burley, Idaho, initiated a "first" in not holding an "all-classroom" Bureau of Mines First Aid Refresher Course.

Employees attending this review enthusiastically accepted drawing numbers to see who would start out as teams (one team being the participants and one being the judges - and alternating each time for the next simulated accident in administering first aid). Also, a point system was kept as to the rights and wrongs when administering first aid to accident victims.

The first simulated accident occurred when two employees fell down the stairs onto the landing from the main office. One victim was in serious condition and the other had minor injuries. The participating team then went to work on the injured employees, administering first aid and preparing the victim for transportation, while the judging team made notes of what was being done for the victims at the time, as a true first-aider would do.

After this was over, employees met in a room to discuss the right and wrong way of handling accident victims, with points given to each team.

The next simulated accident took place when two employees crossed the bridge on the north side canal in inclement weather and icy crossings and crashed a pickup into the carpenter shop. Both victims were injured - one door on the pickup jammed shut. A different participating and judging team went to work administering first aid to these accident victims. Again employees met after it was over to comment on the rights and wrongs of first aid.

Another simulated accident was when a fire and explosion occurred in the plant (with accident victims being taken care of by the participating team and a judging team looking on taking notes).

All in all, the employees are to be commended for the interest and enthusiasm shown in a review such as this held for the first time. Also, the instructors did an outstanding job in setting up and handling this review as to actual handling of accident victims and the discussions held at each session.

Tektite 2 Project, St. John, Virgin Islands: The Department of the Interior is the lead agency in this joint federal-industry-university program. The purpose of the project is to investigate the ocean floor

from the dropoff of the continental shoreline, a largely unexplored area of about one million square miles. Among other things, the underwater explorers will examine the mineral wealth of the ocean bottom, scraping off samples to bring back with them, and will study marine biology, partly in an attempt to learn more about the ocean as a possible world food supply source.

The Bureau of Reclamation's Chief Safety Engineer, Howard S. Latham, is coordinating the safety activities of the program, acting in an advisory capacity to the Program Manager and the Safety Review Board. He developed the health and safety program, provides on-site technical assistance and designates safety personnel from the Bureau of Reclamation to serve as on-site Safety Engineers. Messrs. George "Dan" Winans, Frank Kouba, and Dennis Fankhouser have served as On-site Project Safety Engineers stationed at St. John, Virgin Islands.

The Department Safety Manager serves as a member of the Safety Review Board, which includes representatives from private industry, universities, and other Government agencies. The function of the board is to review the project's overall program from a safety viewpoint.

Parker-Davis Project, Phoenix, Arizona--Safety barrier and seat belt again prevent serious injury: A Bureau of Reclamation sedan went into a broadside skid, then off the road to the left and dropped 4 feet into a borrow pit and rolled over onto its top after a driver lost control while traveling at 55 miles per hour.

Cargo contained in the vehicle consisted of a full tool box, electronic tube tester, and electronic tube caddy, a suitcase, etc.

The vehicle was equipped with a pressed wire screen barrier to separate the cargo compartment from the driver. The seat belt was in use. Personal injury consisted only of a minor bruise to the right leg just below the knee.



Photo PX-D-67872

The presence of the safety barrier and use of the seat belt undoubtedly prevented serious injury or a fatality.

\* \* \* \* \*

# WATER SAFETY

## RECORD OF PUBLIC DROWNINGS

January 1, 1970, through September 30, 1970

### Bureau-operated Facilities:

Canals	25
Reservoirs	1
Total	<u>26</u>

### Facilities Operated by Others:

Irrigation and Water Districts	33
State or County (Recreational)	53
Total	<u>86</u>

### Summary of Total Drownings During Period:

By Operating Agency:	
Bureau of Reclamation	26
Irrigation and Water Districts	33
State or County (Recreational)	53
Total	<u>112</u>

By Type of Facility:	
Canals	52
Reservoirs	60
Total	<u>112</u>

By Activity:	
Swimming	42
Boating	16
Fishing	5
Fell into water	16
Other	33
Total	<u>112</u>

By Age:	
Under 12 years of age	18
From 12 to 25	58
From 25 to 50	19
Over 50 years of age	17
Total	<u>112</u>

\* \* \* \* \*



# VEHICLE SAFETY

## WINTER DRIVING REVIEW

The Canada Safety Council, in cooperation with the Rubber Association of Canada, is sponsoring a Winter Tire Education Campaign to warn drivers of ice and snow hazards.

To help you review your winter driving safety program, here is a series of tested driving methods recommended by the Canada Safety Council.

1. Start the vehicle in DRIVE with an automatic transmission or in second gear with a manual transmission. Use the gas pedal gently.
2. Keep both hands on the wheel because snow and ice can make steering touchy.
3. Keep your tires rolling on ice if possible. Even moderate braking can lock the front wheels and make steering impossible.
4. Don't spin your wheels. This only melts the snow and ice and reduces traction. Sand, rubber or metal mats or pieces of carpeting under the rear wheels can be of help if you get stuck. Make sure no one is around the rear wheels in case the material should be thrown from under the wheel.
5. Avoid sharp changes of direction. This can result in skidding.
6. If you do start to skid, steer in the direction of the skid but straighten the wheels as soon as you feel the vehicle coming out of the skid.
7. Keep your distance. Quick steering action is impossible on ice. It also takes more distance to stop on ice.
8. Begin to stop sooner on snow and ice. Look ahead to anticipate slowing movements. Plan your maneuvers well in advance.
9. Pump your brakes. Quick, hard pumping alternates locked wheels and rolling action and helps maintain steering control.
10. Be especially careful when driving on glare ice.

## MANDATORY JAIL SENTENCE

A bill to make a 10-day jail sentence mandatory for anyone convicted of drunken driving was recently given final passage by the Idaho legislature and sent to the governor for signature.

## DEPTH PERCEPTION -- HOW IMPORTANT IS IT?

--Reprinted from National Safety Council's  
Fleet Safety Newsletter, February 1970

Recently we received the following inquiry: "How important is depth perception as a requirement for highway vehicle operators?" And: "What is a reasonable requirement for depth perception as evaluated by instrument testing?"

Here is our answer:

"Tests for depth perception should be incorporated into a first-class driver's visual examination, because drivers are continually being called upon to exercise their distance and space perception in estimating such distances as that between their own cars and the edge of the road, people, or other cars on the highway.

"A well-known test for space perception is known as the Army Peg Test, or the Howard-Dohlgan Rod Test. A variation of this test has the substitution of miniature automobiles for the pegs. These are set at four separate distances, with the front axles even with the standard pegs. Light is controlled, and the conditions are carefully standardized. Each instrument must be calibrated after it is built to be sure of accuracy, since illumination, type of cars used, and other factors affect readings. (Source: Manual on Drivers' Vision Test, published by the American Optometric Association.)

"Unfortunately, almost all tests purported to test depth perception are actually tests for stereopsis.

"Stereopsis is defined as the binocular (two-eyed) appreciation of the three dimensions of space. Only binocular individuals can experience stereopsis, which is dependent upon viewing an object from two different angles at the same time. It is this visual ability that is tested in most so-called depth perception tests.

"In conclusion, Mr. Robert C. Sneller states in his book, Vision and Driving, published by the American Optometric Association:

"Distance Judgment-As no true test of this skill exists in instrument form, it is necessary to limit investigation to the area of stereopsis. Those individuals failing a stereopsis test should be referred for professional evaluation."

## COMMERCIAL DRIVERS MUST WEAR SAFETY BELTS

Federal Highway Administrator F. C. Turner has announced that an amendment to the Motor Carrier Safety Regulations will require that seat belts be installed in commercial vehicles -- and that they must be worn by the drivers while the vehicles are in operation.

The new regulations provide that seat belts for the drivers of buses, and the drivers and co-drivers of trucks and truck tractors, must be installed in all motor vehicles used in interstate or foreign commerce which are built on or after July 1, 1971. Older vehicles -- manufactured after January 1, 1965, must be retrofitted with seat belts by July 1, 1972. In addition, new commercial vehicles with sleeper berths must be equipped with sleeper berth restraint systems to avoid ejection of the occupants during accidents.

A landmark provision of the new regulation is the requirement that, "A motor vehicle which has a seat belt assembly installed at the driver's seat shall not be driven unless the driver has properly restrained himself with the seat belt assembly." Dr. Robert A. Kaye, Director of the Bureau of Motor Carrier Safety, observed that "Seat belt use by commercial drivers . . . promises to improve the driver's control of his vehicle in emergency situations," thus providing an added safety benefit for other users of the highway in addition to protection for commercial vehicle occupants themselves.

To insure the full effectiveness of the requirement for installing seat belts for the driver's use, Dr. Kaye said it was obvious that the regulations must require drivers to use their seat belts.

### IF SAFETY DEVICES ARE USED --

The 1970 models of automobiles incorporate all the Federal Government's safety requirements. These standards call for design modifications within cars to reduce injuries when passengers hit interior surfaces, plus some features aimed at accident avoidance. Studies of late model cars, conducted at the University of Michigan's Highway Safety Research Institute, show that if safety devices are used, it's difficult to be seriously injured in a U.S. car at 25 miles an hour or less. A few years ago there were deaths at speeds less than 10 miles an hour.

In spite of their worth, studies show that less than 50 percent of motorists use lap belts and only about 10 percent use shoulder restraints. Yet National Safety Council estimates that seat belts saved 2,500 to 3,000 lives last year; but if everyone used them, another 6,000 to 7,000 lives could be saved annually. Thus several of the 55,200 deaths on U.S. roads last year could have been avoided and many of the 2 million disabling injuries could have been less severe.

## DON'T BE A STATISTIC !

### MAKE SAFE DRIVING A HABIT !

Three times as many Americans have been killed by automobile accidents than by all the wars the United States has been engaged in since it was founded in 1776. Here are the actual figures:

<u>Deaths Due to Auto Accidents</u>		<u>Deaths Due to Wars</u>	
From 1900 to 1942	723,688	All Wars Prior To	
From 1943 to 1946	109,592	World War I	193,854
From 1947 to 1950	131,420	World War I	50,510
From 1951 to 1954	181,800	World War II	275,338
From 1954 to 1961	227,542	Korean War	30,350
From 1961 to 1969	380,487		
TOTAL - 1,754,529		TOTAL - 550,052	

### NIGHT DRIVING

Never wear tinted glasses while driving at night to reduce the glare of oncoming headlights. The National Society for the Prevention of Blindness reports that tinted lenses reduce the total light transmitted to the eye, making it more difficult to see at night.

Even a faint tint can cut the light intake by 15 to 20 percent. If you wear sunglasses during the day, be sure to remove them at dusk.

\* \* \* \* \*

### A MILLION CARS WILL BE STOLEN THIS YEAR

One American sports car is so theft-prone that the number of them stolen will equal the number of them on the road. If yours isn't stolen, someone else's will be--twice.

\* \* \* \* \*



## DO YOU KNOW HOW TO DRINK?

--Reprinted from the May 1970 issue of OCCUPATIONAL HAZARDS Magazine. Copyrighted 1970 by the INDUSTRIAL PUBLISHING COMPANY, a Division of Pittway Corporation.

Do your employees know the facts about alcohol and safety? Studies in Wisconsin and California show that drinking was involved in more than 50 percent of fatal traffic accidents. In 1968 more than 25,000 Americans died in traffic accidents involving alcohol. A Massachusetts study reported 20 percent of males and 9 percent of females in home accidents had been drinking; kinds of accidents that turned up in that study included falling asleep with lighted cigarettes, accidental poisonings, and drownings. Studies indicated that employees who are alcoholics have more than twice as many on-the-job accidents and at least 10 times as many off-the-job accidents as do non-drinkers.

Although the problem drinker and the alcoholic are the chief safety menaces, so-called social drinkers are frequently involved in accidents and should know how alcohol affects them. The American Medical Association passes on these facts:

Alcohol is a depressant, not a stimulant. It first relaxes judgment and social restraint, then attacks simply motor functions, reaction times, and vision. Balance, coordination, and sensory perception go next. Concentrated drinking will lead to stupor, coma, even death.

Coffee, fresh air, cold showers, or other stimulants will not overcome the effects of alcohol. Only time can sober up a drunk.

Alcohol is converted to food by the liver or to wastes by the lungs and kidneys. The process takes about three hours for each ounce of pure alcohol. Translated, that's about one hour for each bottle of beer or shot of whiskey. Thus, it's acceptable for a person to have a drink before dinner, because in most cases the alcohol will be eliminated by the time dinner is finished. If you're out on the town, space drinks an hour apart. The cocktail party host has an obligation to his guests, especially to those who are driving, to establish a leisurely drinking pace as he dispenses drinks.

The States are divided over the question of how high blood-alcohol levels must be to constitute intoxication. Most States say the level must reach .15, other say .10. However, blood-alcohol levels as low as .04 have caused accidents. When the level reaches .06 the probability of an accident is twice that of the no-alcohol level; at .10 probability is six times and at .15 probability is 25 times greater than the no-alcohol level.

\* \* \* \* \*

## PERFORMANCE ERRORS CALLED "ACCIDENTS"

---Reprinted courtesy of FOCUS,  
Journal of the National Safety  
Management Society

The terms "accident" and "error" may well be synonymous when used in connection with loss prevention. Appearing before the Federal Safety Council in 1962, Dr. John J. Brownfain made clear this point: "In science, if you know the cause of an event, that event is not an accident." He went on to explain that "In everyday life, if we do not like the end result of this event, and at the same time want to escape personal responsibility for it, we are inclined to call it an accident."

Dr. Brownfain's observations could be important to a substantial change in safety management philosophy. Few will disagree that the causes of most accidents (events) are well known. Thus, what safety managers are really doing is striving to eliminate performance errors that produce injury and property damage which are called "accidents." Carrying this thought one step further, one might deduce that safety activities are directed at management improvement rather than at reduction of personal suffering, although the end result remains the same.

No errors, no accidents. It is as simple as that. And it's equally simple to equate that, if errors can happen, they will happen. Accordingly, when what we now call "accidents" do occur, an error--or several errors--can be lined up in the witness box. Unfortunately, management does not concern itself greatly with "accidents" for two reasons. First, it can insure itself against direct loss. Second, the happening can be loosely connected with the individual involved and not related to management itself. Some will even try to explain such occurrences as the "Will of God."

On the other hand, "errors" are factors of profit and loss and very closely relate to poor management. "Errors" are symbolic of failure and are deemed correctable. Axiomatically, the better management has fewer errors. Thus, the very substitution of the word "error" for "accident" should bring about immediate high level attention. Try it and see. This same concept is based on the fact that good management seeks constantly to function without error. Imperfect performance has no place in a well planned business organization.

Safety managers are well aware that there is no perfection among employees or their managers. If there were, safety experts would swell the ranks of the unemployed. We still battle the odds and still work to help management toward the goal of errorless operations, free of injury and property damage.

\* \* \* \* \*

## IS YOUR OFFICE SAFE?

--Reprinted with permission from Just Between Office Girls, published by the Bureau of Business Practice, 24 Rope Ferry Road, Waterford, Conn.  
Copyright 1970.

If we worked in a plant around smelting ovens or in a lumber mill that had big buzzing saws, we'd know we were working in a dangerous area, and we'd "play it safe." But it's hard to believe there are danger spots in an office too.

For example, take a look at the file cabinet. There's nothing really lethal about this piece of office equipment. It's part of our everyday working lives - we use it almost as much as we do our typewriter. But it has hidden hazards. A heavy top drawer left open could cause the entire cabinet to tip over on some unsuspecting passer-by. A bottom drawer left out could trip and seriously hurt anyone who isn't watching his step.

A file cabinet is just one of many potential perils we should guard against. So, to make sure you're not taking unnecessary risks while on your job, answer the following questions. Any of the hazards mentioned could cause injury to you or your coworkers, perhaps putting you or them out of commission for a long time.

- ✓ Are there any obstructions in the aisle near your desk? A misplaced wastebasket, a box of office supplies, a shopping bag, or a suitcase packed for a holiday weekend could play havoc in an office.
- ✓ Where do you keep your razor blades in the office? They should be put in a special place with a protective covering on them. The same precaution applies to sharp scissors and letter openers.
- ✓ Is the wastepaper basket close to your desk or just within throwing distance? Even a paper clip or an old pencil that landed on the floor instead of in the basket could cause trouble.
- ✓ Is your typewriter securely fastened to your desk or to your typing table? What about desk-top office machines? Be sure to keep them away from the edge of your desk.
- ✓ Does your typing chair have secure casters? Even if it does this doesn't mean you should stand on it to reach something. And how about the chair back? Is it solid so that you can lean against it with safety?

- ✓ Do you make it a point to keep your desk drawers' closed when you're not using them? It's a good habit to follow if you want to avoid battered shins.
- ✓ Does any of your furniture have splinters or rough edges? Aside from causing runs in your stockings, sharp edges can cause painful cuts and bruises, unless they're taped over.
- ✓ Is your ashtray in a safe place or is it near your wastebasket? A hurried flick of ashes can start a flash fire in a basket full of paper. And a good rule of thumb is to never walk away from a lighted cigarette.
- ✓ How safe are the electric wires in your office? If any are frayed or loose at the connections, you should report them immediately. Also too-long telephone cords can trip you.
- ✓ Is the office pencil sharpener attached to a door frame at eye level? If it is, someone rushing through the door may get a black eye if she collides with it.

\* \* \* \* \*

#### DRY ICE NOT COOL

--National Safety Council Textile  
Newsletter

There appears to be no end in sight to the ways youngsters discover to jeopardize their lives, limbs, and eyesight. Now the "craze" is putting dry ice into a glass bottle and then shaking it to allow the resulting carbon dioxide gas to build up pressure and explode. Three children in Illinois have each lost an eye as a result of this unsafe practice, and another suffered laceration of the arm, requiring 20 stitches.

Unfortunately, this diversion is gaining in "popularity." All users of dry ice are being advised to dispose of this surplus refrigerant in open containers indoors where children won't have access to it. It is recommended that parents recognize this hazard and never leave dry ice accessible to their children.

\* \* \* \* \*



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Ferry Road, Waterford, Conn. Copyright 1970.

## QUIET, PLEASE!

We're hearing quite a lot these days about environmental pollution. One type we all can do something about is noise pollution-especially noise in the office.

Somebody once said that a sound doesn't have to be loud to be a noise. It just has to be annoying. For example, the sound of someone smacking a book shut can jar you even though it doesn't have much volume. Yet the steady, rhythmic sound in a room full of busy typists can be loud, but quite pleasant.

Many office workers are noisemakers, probably without realizing it. Here are a few of the ways they contribute to noise pollution:

- Slamming doors or file cabinet drawers.
- Dropping the dictionary or phone directory on a desk.
- Banging a chair against the wall when getting up.
- Letting a phone ring six or eight times before answering it.
- Wheeling back and forth in a squeaky chair.
- Talking or laughing loudly.
- Whistling, singing or humming.
- Cracking gum.

We've all been guilty of at least one of these faults sometime during our office careers. So why not resolve to change now. Help get rid of noise pollution in your office.

\* \* \* \* \*

## HEAD RESTRAINTS

A recent survey by the Texas Safety Association has shown that a large proportion of Texas motorists do not have the head restraints in their cars properly adjusted to protect against whiplash. TSA General Manager Lloyd F. Palmer cautioned that head restraints are not meant to be head rests, and they should be adjusted so that they are centered at the back of the head, not at the neck. Leaving the restraint adjusted at the back of the neck could result in major injury in a rear-end collision, he warned.

\* \* \* \* \*

## HIGHLIGHTS OF FEDERAL CONSTRUCTION SAFETY ACT (PL 91-54)

The Construction Safety Act, approved August 9, 1969, amends the Contract Work Hours Standards Act of 1962 (Public Law 87-581). Applicable to all federal and federally financed or federally assisted construction projects.

### Analysis of the Major Provisions of the Act

It shall be a condition of each contract in excess of \$2,000 covering construction, alteration, and/or repair, including painting and decorating, that no contractor or subcontractor contracting for any part of the work shall require any laborer or mechanic engaged in the performance of the contract to work in any place, or under any working conditions, which are unsanitary, hazardous or dangerous to health and safety.

Safety and health standards to be formulated by regulation by the Secretary of Labor only after a formal agency hearing . . . in consultation with an advisory committee.

Authorizes Secretary to make inspections, hold hearings, issue orders, and make decisions based upon findings of facts deemed necessary to gain compliance.

In the event of non-compliance the agency for which the work is being done may cancel contracts, and enter into other contracts, charging additional cost to the original contractor. Where the contract is financed in whole or in part by loans or grants made, guaranteed, or insured by the United States, the Governmental agency providing such assistance may withhold it.

U. S. District Courts are granted jurisdiction over actions brought by the Secretary to enforce compliance with the health and safety standards.

If Secretary of Labor determines after a formal agency hearing that a contractor or subcontractor, by repeated willful or grossly negligent action, has violated the act, then the Secretary will transmit the name of the violator to the Comptroller General.

Firms so listed shall be debarred from contract awards for a period of three (3) years.

Any person aggrieved by the Secretary's actions may obtain judicial review with the appropriate U. S. Court of Appeals.

Secretary shall establish in the Department of Labor an Advisory Committee. Three members shall be contractors, three members building trades industry employees, and three public representatives with competence in the construction safety field.

Advisory Committee shall advise the Secretary in the formulation of construction safety and health standards and other regulations and policy matters.

Secretary of Labor shall provide for the establishment and supervision of programs for the education and training of employers and employees in the avoidance of unsafe working conditions. Secretary shall collect such reports and data to consult with and advise employers in the prevention of accidents.

\* \* \* \* \*

### SHOTCRETING PRESENTS HEALTH HAZARD

Sodium, potassium hydroxide, and other chemicals contained in shotcrete accelerators and hardeners are moderately toxic and can cause skin and respiratory irritation unless adequate safety measures are undertaken. It is recommended that in applying shotcrete containing toxic accelerators or hardening admixtures the nozzle men and helpers should wear sandblasting hoods supplied with filtered air free of toxic or objectionable material. In order to protect against dermatitis, they should also wear gloves and necessary protective clothing.

Shotcrete consisting of sand and cement without coarse aggregates does not usually contain chemical accelerators or hardening admixtures. In applying this type of shotcrete, face protection and dust respirators afford adequate protection.

\* \* \* \* \*

### MANDATORY USE OF SAFETY LENSES

Beginning January 1, 1971, Connecticut laws require that all eye glasses and sun glasses made or sold in the state must have safety lenses. The law also bans spectacle frames of cellulose nitrate or other flammable material. Connecticut is the second state with such a law. Alaska was the first.

\* \* \* \* \*

If you don't believe in cooperation, just observe what happens when one wheel of a wagon comes off!

\* \* \* \* \*

## CARBON MONOXIDE--CO--THE CREEPING KILLER

This won't be news to you, but carbon monoxide (CO) is a real killer. In fact, because it's so hard to detect, it creeps in and kills far more people each year than any other gas does, probably more than all other gases put together.

Carbon monoxide is very common. All you need to do to make it is to burn anything containing carbon--wood, clothing, coal, gasoline, and particularly so if they are burned without enough air.

Carbon burns first to carbon monoxide which, if it gets enough oxygen, burns to carbon dioxide. But the carbon monoxide has to be hot to burn so if it gets away from the fire before the oxygen reaches it, it stays carbon monoxide.

That's why it's so dangerous to damper the ordinary room type gas heater. You're likely to get carbon monoxide. If you go to bed with one of these heaters burning without a good vent, you may never wake up. A good many people die that way every year. Electric room heaters are far safer.

You can't smell carbon monoxide. It has no taste, either. It won't even tickle your nose or lungs or make you sneeze. If you breathe much of it, you just get drowsy and pass out. Unless you're rescued, you die.

When you can smell the exhaust from your car or when it's irritating, you're burning some oil or getting some breakdown products of the gasoline. You aren't smelling carbon monoxide, but there is some there.

Carbon monoxide is not a poison. It kills by depriving a person of oxygen. The same thing happens in drowning or in choking to death.

The human machine runs on oxygen. The function of the red blood corpuscles is to absorb oxygen from the air breathed in by the lungs and carry it all through the body where it is used. But these corpuscles greatly prefer carbon monoxide. They'll absorb it about 300 times faster than they'll absorb oxygen.

That means that if there's only a little carbon monoxide in the air a person breathes--say 1/10 of 1 percent or so--his blood soon becomes so loaded with the carbon monoxide that it can't carry enough oxygen for his needs and he passes out. You can't safely breathe more than one-tenth of that amount--100 parts per million--all day. Even that little will give some people a headache.

There's one good thing about carbon monoxide. If it doesn't kill a person, he'll practically always recover, usually overnight or so,



in fresh air. It doesn't ordinarily cause any continuing injury, either. In a very few reported cases, however, persons overcome by carbon monoxide suffered some permanent brain damage. Brain cells die very quickly if deprived of oxygen.

Every gasoline or diesel engine gives off carbon monoxide--lots of it. You can't fix these engines so they won't. So if you must run them indoors, hook their exhausts up to an exhaust system designed for the purpose or at least run the exhausts outside. Also, have good ventilation to take care of any leakage.

It's important, too, to remember that any fire or fuel-heated furnace or oven may give off carbon monoxide. In fact, almost all furnaces do. That's why furnaces and ovens indoors should be hooked up to suitable stacks or exhaust systems or have smoke pipes of their own.

Fires that get plenty of oxygen seldom produce much smoke. So be very suspicious of a smoky fire. It's probably giving off plenty of carbon monoxide.

Carbon monoxide indicators that measure the amount of this gas in the air should always be used to show whether or not it's present in tanks or other closed spaces that might contain carbon monoxide.

Masks are available that will protect a person against up to 2 percent carbon monoxide by means of chemicals that absorb it. For higher concentrations than 2 percent, the supplied-air type of equipment is necessary. In any case, when dealing with carbon monoxide in any amount, a man must know what he's doing if he's to avoid trouble.

The know-how of safety with carbon monoxide is a good thing to take home with you. If you do use either a portable gas or oil heater, fasten it down and run a smoke pipe outdoors. Fix it so it can't be dampered off, and make sure it always has a good draft.

Another thing, if you have an attached garage, make sure your automobile exhaust can't get into the house.

Finally, if you have any other gasoline engine like the usual power lawn mower, don't ever tune it up indoors. That's strictly outdoor work.

\* \* \* \* \*

## FIRE HAZARDS LIVE ON APATHY

--By Sylvia Porter

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Courtesy Publishers-Hall Syndicate

At least 12,000 Americans will have lost their lives in fires - more than 6,500 of them in home fires - by the time 1970 ends. And at least \$700 million will have been lost in home fires alone.

But if you are typical, you are permitting many of the greatest fire dangers to remain in and around your house. Also if you are typical, your house and its contents are drastically underinsured against fire - and you are blissfully unaware of your financial risks.

To check yourself, make a brief but objective inspection of your house with this column in hand. See if you can answer "yes" to all of these questions:

Do your gas and electric appliances bear the seal of the American Gas Association and Underwriters Laboratories?

### FIRE EXTINGUISHER?

Is your kitchen equipped with a suitable, properly charged extinguisher for grease and-or electric fires - and does EVERYBODY in your family know how to use it?

Are your ashtrays large and plentiful enough for the amount of smoking that goes on?

Are the small children in your family well informed about fires and matches - and have you taken the time to teach the proper use of matches to those who have developed a keen curiosity about them?

Are such items as your chafing dishes and fondue pots protected by metal trays underneath to catch any overflow of alcohol?

Do you have your furnace, water heater and chimneys serviced and-or inspected regularly for safety?

Is the gas can for your lawn mower, chain saw, etc., stored properly and in a safe place? And what about the substances with which you start barbecue fires?

Have you cleaned up and cleared out any piles of old papers and-or oily rags from your attic, basement, garage?

Are your cleaning fluids of the nonflammable sort?

On top of this checklist - only a partial one - has your family a specific, rehearsed fire escape plan in which each of you knows what to do, where to go, how to call for help?

The leading causes of building fires today, says the National Fire Protection Association in Boston, are: smoking and matches; defective or inadequate electrical wiring and other equipment; defective or careless use of electrical appliances; defective or overheated heating and wiring equipment, chimneys and flues; hot ashes and coals and combustibles near heaters; misuse of matches by children. These alone are behind two-thirds of today's building fires.

Here, therefore, are a few key guides to help you prevent these and other causes of fires at home.

- Be warned if your TV picture contracts when your refrigerator or furnace goes on or if fuses blow repeatedly. This is a clear signal that you have electrical wiring problems.

#### EXTENSION CORDS

- Don't string inexpensive extension cords throughout your house and risk overloading your wiring system.

- Don't use too-light dimestore cords for heavy appliances such as electric irons, space heaters, rotisseries, power tools.

- Don't try to stretch the electrical capacity by putting in heavier and heavier fuses. "Overfusing" is a common practice but potentially very dangerous.

- Don't put pennies behind your fuses to get them to carry a bigger load. Again the danger is you'll overload your wiring.

- Inquire about the flammability characteristics of all materials in your house - from paints and insulation to curtains and carpets.

- Be sure you have a proper, effective lightning protection system, capable of intercepting lightning bolts from the roof, metal equipment, antennae, power lines and nearby trees that are taller than your house. A proper system will be marked by a "Master Label" plate, issued by Underwriters Laboratories.

- Ask a qualified electrician to check your entire electrical system if you have any reason to suspect its adequacy. The check may cost from \$50 to \$150, but it will be a worthy investment indeed.

\* \* \* \* \*

# FIRST AID

## FOR EYE AND EAR INJURIES

### I. EYE INJURIES

The eye is a very sensitive organ and an injury, even a minor foreign body, can be extremely painful. Any first aid or treatment should be given with utmost caution to prevent impaired vision or the danger of infection. Hands should always be thoroughly washed with soap and water before attempting to give any eye care.

The following supplies should be maintained in the first aid kit to handle eye injuries:

A plastic squeeze bottle of eye irrigating solution  
Sterile eye pads  
Scotch Tape

Some of the most common eye injuries encountered and the first aid to be given are listed below:

#### FOREIGN BODIES

1. Look the eyeball over for the foreign body. If the particle is floating or lying free, flush gently with eye irrigating solution directing the flow away from the nose.

IF THE FOREIGN BODY REMAINS IT IS EMBEDDED.  
UNDER NO CIRCUMSTANCES SHOULD THE FIRST AID  
WORKER ATTEMPT TO REMOVE A FOREIGN BODY  
FROM THE EYEBALL.

2. Refer all cases in which foreign body is embedded on the eyeball or lid to the doctor.

#### CHEMICAL BURNS

The longer the chemical remains in the eye the deeper the burns. The eye must be washed immediately and thoroughly with water.

1. Holding the eye open, pour water into the inner corner of the eye allowing it to run over the eyeball and under the lids. Continue to wash the eye in this manner for at least 20 minutes to remove all possible chemical. Do not use an eye cup.



2. Cover the eye with a sterile eye pad.
3. Refer to the doctor immediately.

#### FLASH BURNS

1. Apply cold compresses for temporary relief.
2. Refer to the doctor.

#### BLOWS OR LACERATIONS OF THE EYE

1. Do not attempt to open the lids to remove any foreign bodies or to examine the eye.
2. Cover the eye with a sterile eye pad.
3. Place the injured employee on a stretcher with as little movement as possible.
4. Transport to a physician immediately.

### II. EAR INJURIES

Ear injuries usually consist of foreign bodies or burns of the ear canal. The first aid for ear injuries consists mainly of "DON'TS."

DON'T attempt to remove any foreign body from an ear canal.

DON'T irrigate the ear canal with any solution.

DON'T put any medication or drops into the ear.

DO take a history of the injury and refer the injured employee to the physician immediately.

---By Teresa Moffitt, Health Consultant  
Liberty Mutual Insurance Company  
(Reprinted from Construction Safety  
Release No. 90 with permission  
from the National Safety Council)

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# SAFETY PERFORMANCE RECORD

## CUMULATIVE QUARTERLY REPORT GOVERNMENT FORCES

3rd QUARTER, 1970

PERIOD FROM JANUARY 1, 1970... THROUGH September 30, 1970...

REPORTING OFFICE	NUMBER OF EMPLOYEES	MAN HOURS	DISABLING INJURIES		DAYS LOST	FREQUENCY RATE	SEVERITY RATE
			CUMULATIVE THIS YEAR	FATAL *			
Washington Office	284	458,108					
Denver Office	1,211	1,976,328					
REGION 1							
Boise Regional Office	186	225,839	3		135	13.2	595
Central Snake Project	39	54,732					
Chief Joseph Dam	26	46,139					
Columbia Basin Project	270	630,240					
Grand Coulee Dam Operations	311	319,479	1		180	3.1	563
Green Springs Powerplant	2	3,036					
Hungry Horse Project	45	60,630					
Lower Columbia Development Office	56	76,201					
Lower Teton Project Office	8	13,210					
Minidoka Project	72	109,763					
Snake River Development Office	53	79,878					
Third Powerplant Construction Office	200	266,216					
Upper Columbia Development Office	44	61,423					
Yakima Project	31	43,452					
Totals & Averages	1,349	1,993,938	4		315	2.0	158
REGION 2							
Sacramento Regional Office	523	903,064					
Regional Drill Crew	39	63,786	1		12	15.7	188
Auburn-Folsom South Unit	237	343,260					
Cachuma Operations Field Branch	2	3,040					
Central Coast Development Field Branch, Santa Barbara	4	5,872					
Fresno CVP Construction Office	135	210,338					
Folsom Field Division	78	118,752					
Klamath Project Office	17	26,714					
Lahontan Basin Projects Office	22	44,144					
Napa Development Field Branch		1,504					
Sacramento Valley CVP Constr. Office	114	177,312	1		5	5.6	28
San Luis Unit CVP Construction Office	47	93,933					
Shasta Field Division	144	218,842	1		8	4.6	37
Solano Operations Field Branch	2	3,888					
Tracy Field Division	159	250,601					
Upper North Coast Development Field Branch, Eureka		2,496					
Fresno Field Division	142	215,120	1		20	4.5	93
Totals & Averages	1,665	2,682,666	4		45	1.5	17
REGION 3							
Boulder City Regional Office	197	290,600					
Boulder Canyon Project	158	233,960					
Dixie Project Office	6	10,443					
Lower Colorado River Project	203	281,770					
Parker-Davis Project	352	552,768					
Phoenix Development Office	107	134,400	2		89	14.9	662
Southern California Dev. Office	25	31,209					
Southern Nevada Water Project	101	145,985	1		33	6.8	226
Yuma Projects Office	141	196,960					
Totals & Averages	1,290	1,878,695	3		122	1.6	65
REGION 4							
Salt Lake City Regional Office	204	326,215					
Central Utah Projects	189	277,790					
CRSP Power Operations Office	267	384,209	1		3	2.6	8
Curecanti Unit	80	116,484					
Durango Projects Office	27	40,754					
Grand Junction Projects Office	50	77,668					
Logan Development Office	5	7,800					
Lyman Project Office	19	30,818					
Upper Green River	21	29,932					
Totals & Averages	862	1,291,670	1		3	0.8	2
REGION 5							
Amarillo Regional Office	101	141,737					
Albuquerque Development Office	31	52,371					
Austin Development Office	41	65,160					
Loan Program Projects Office	1	1,560					
Middle Rio Grande Project	217	355,504	4		167	11.3	470
Navajo Project	70	111,384					
Oklahoma City Development Office	22	26,036					
Pecos River Office	19	22,956					
Rio Grande Project	204	310,075					
San Juan-Chama Project	50	103,759					
Totals & Averages	756	1,190,562	4		167	3.4	146
CONSOLIDATED TOTALS							
TOTALS LAST YEAR (19 )							

\*FATALITIES INCLUDED IN TOTAL DISABLING

# SAFETY PERFORMANCE RECORD

## CUMULATIVE QUARTERLY REPORT

### GOVERNMENT FORCES

3rd QUARTER, 1970.

PERIOD FROM JANUARY 1, 1970.. THROUGH September 30, 1970..

[illegible]

# SAFETY PERFORMANCE RECORD

## CUMULATIVE QUARTERLY REPORT

### CONTRACTOR FORCES

3rd QUARTER, 1970

PERIOD FROM JANUARY 1, 1970 THROUGH September 30, 1970

REPORTING OFFICE	NUMBER OF EMPLOYEES	MAN HOURS	DISABLING INJURIES		DAYS LOST	FREQUENCY RATE	SEVERITY RATE
		CUMULATIVE THIS YEAR	CUMULATIVE THIS YEAR	FATAL *	CUMULATIVE THIS YEAR	CUMULATIVE THIS YEAR	CUMULATIVE THIS YEAR
REGION 1							
Chief Joseph Dam Project		10,255					
Columbia Basin Project	38	102,590	3		26	29.2	253
Lower Teton Project Office	20	8,991					
Minidoka Project		2,097					
Third Powerplant Construction Office	1,037	1,096,680					
Yakima Project		872					
Totals & Averages	1,095	1,221,485	3		26	2.5	21
REGION 2							
Auburn-Folsom South Unit	265	138,941	3		59	21.6	425
Fresno CVP Construction Office	201	102,268					
Fresno Field Division	7	2,090					
Lahontan Basin Projects Office	8	7,450					
Sacramento Valley CVP Constr. Office	212	182,986	1		45	5.5	246
San Luis Unit CVP Construction Off.	2	30,370					
Tracy Field Division	1	3,122	4		104	8.4	219
Totals & Averages	700	475,207	4		104	8.4	219
REGION 3							
Boulder Canyon Project		584					
Lower Colorado River Project	2	17,999					
Parker-Davis Project		51,841					
Southern Nevada Water Project	352	406,843	6		169	14.7	415
Yuma Projects Office	8	14,139					
Totals & Averages	362	491,406	6		169	12.2	344
REGION 4							
Central Utah Projects	227	220,335	2		60	9.1	272
CRSP Power Operations Office		216					
Circumant Unit	176	167,925	1		7	6.0	42
Grand Junction Projects Office	1	811					
Lyman Project	38	28,530					
Salt Lake City Regional Office	28	8,220					
Upper Green River	4	1,603					
Totals & Averages	476	428,413	3		67	7.0	156
REGION 5							
Navajo Project	13	16,727					
Pecos River Office	3	3,649					
Rio Grande Project		1,421					
San Juan-Chama Project	155	533,095	3		140	5.6	263
Totals & Averages	171	554,892	3		140	5.4	252
REGION 6							
Missouri-Oahe Projects	63	185,341	1		25	5.4	135
Missouri-Souris Projects	174	173,218	2	1	6,001	11.5	34,644
Riverton Project	6	6,058					
Upper Missouri Projects	7	12,928					
Totals & Averages	250	377,545	3	1	6,026	7.9	15,961
REGION 7							
Fryingpan-Arkansas Project	509	245,124	5		36	20.4	147
Glen Elder Unit (Closed 6-30-70)		11,225					
Kansas River Projects	45	36,087	1		2	27.7	55
North Platte River Projects	53	23,206					
South Platte River Projects	5	5,339					
Totals & Averages	612	320,251	6		38	18.7	118

\*FATALITIES INCLUDED IN TOTAL DISABLING





DON'T BE DISTRACTED  
FROM YOUR DRIVING  
STOP IF YOU MUST



# THE ANTI-LITTER BUG

## FOR SAFETY'S SAKE

### PICK UP—CLEAN UP—SHAPE UP





# RECLAMATION SAFETY NEWS



# ZERO in

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UNIVERSITY OF ILLINOIS  
AT URBANA-CHAMPAIGN

# ON SAFETY..

*Fourth Quarter and  
Annual Report 1970*

UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF RECLAMATION  
ENGINEERING AND RESEARCH CENTER  
DENVER, COLORADO



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Front Cover by J. L. Vitaliano, Illustrator, Denver E&R Center

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Colorado, in the interest of accident prevention.

# BUREAU SAFETY PERFORMANCE

## 1970 CUMULATIVE ACCIDENT RECORD

January 1 - December 31, 1970

### A. GOVERNMENT FORCES

<u>Region</u>	<u>Injury index*</u>	<u>Frequency rate</u>	<u>Severity rate</u>	<u>Vehicle accident rate*</u>
Region 4	0.05	1.2	4	0.9
Region 2	0.7	2.0	34	2.2
Region 6	1.1	2.3	47	2.4
Region 3	1.3	1.6	84	2.1
Region 5	2.7	2.5	106	2.5
Region 1	34.8	1.9	1,832	4.5
Region 7	<u>150.3</u>	<u>4.4</u>	<u>3,415</u>	<u>3.6</u>
Totals to Date	11.2	1.8	620	2.6
<hr/>				
Totals 1969	10.7	1.6	671	3.1

\* Injury index is equal to frequency rate times severity rate divided by 100.  
Vehicle accident rate is the number of accidents per million miles driven.

### B. CONTRACTOR FORCES

<u>Region</u>	<u>Injury index</u>	<u>Frequency rate</u>	<u>Severity rate</u>	<u>Fatal injuries</u>
Region 4	8.6	6.7	128	0
Region 5	19.8	8.1	244	0
Region 2	24.8	9.7	256	0
Region 1	35.9	2.7	1,331	0
Region 3	39.7	11.7	339	0
Region 7	55.6	16.8	331	0
Region 6	<u>1,529.3</u>	<u>12.3</u>	<u>12,433</u>	<u>1</u>
Totals to Date	137.7	8.3	1,659	1
<hr/>				
Totals 1969	366.4	11.4	3,214	3

### BUREAU CONTRACTORS' 3-YEAR AVERAGE (1968-1970)

Frequency rate            10.8  
Severity rate            3,492

## C. RECLAMATION CIVILIAN CONSERVATION CENTERS

Frequency rate	0.4
Severity rate	9
Vehicle accident rate	16.3

## D. TEKTITE II PROJECT - ST. JOHN, VIRGIN ISLANDS (Undersea Research Program)

Man-hours	358,320
Disabling injuries	1
Days lost	39
Frequency rate	2.8
Severity rate	109

## E. LOST TIME ACCIDENT ANALYSIS - GOVERNMENT FORCES 1970

### Accident Classification:

<u>Description</u>	<u>No.</u>	<u>Days lost</u>
Lifting	4	73
Vehicle	4	117
Struck by object	5	69
Caught in or between	1	4,500
Fall - on same level	3	113
Fall - to different level	12*	6,573*
Slip or twist	5	187
Inhalation	1	3
	<u>35*</u>	<u>11,635*</u>

\*Includes one Job Corps staff member with 36 days lost time.

## F. SERIOUS ACCIDENTS - BUREAU EMPLOYEES

A Region 7 employee suffered fatal injuries as a result of a fall from a transmission line structure on November 3, 1970.

A Region 1 employee suffered a permanent disabling injury on December 18, 1970, when his right arm was caught in a drill auger.

## G. SERIOUS ACCIDENTS - CONTRACTOR EMPLOYEES

A contractor employee in Region 6 suffered fatal injuries when he was crushed by the scraper which he was operating.

A contractor employee in Region 1 suffered a permanent disabling injury when his drill struck and exploded a detonator.

# TREND AND OUTLOOK

**GOVERNMENT FORCES** - During 1970, 9,296 Bureau employees worked 18,719,041 man-hours, experiencing 34 disabling accidents and 1 fatality. While the resulting frequency rate of 1.8 is a commendable safety record, it represents a 12-1/2 percent increase over last year's accident frequency rate. The severity rate of 620 days lost per million man-hours worked is slightly lower than the 1969 severity rate. More encouraging was the 16 percent decrease in motor vehicle accidents as compared with 1969. In experiencing only 2.6 vehicle accidents per 1,000,000 miles driven, the Bureau matched the lowest year of record, which was 1968.

**PUBLIC SAFETY** - Encouraging was the reduction in the number of public drownings on Bureau-operated canals and reservoirs. Recreational use of Bureau reservoirs and lakes is increasing approximately 10 percent a year with over 60 million visitor days logged in 1970. Notwithstanding the increased exposure, there were only 25 drownings on Bureau-operated facilities in 1970 compared with 31 and 28 in 1969 and 1968, respectively.

**JOB CORPS CIVILIAN CONSERVATION CENTERS** - The safety record in Bureau administered Civilian Conservation Centers continued to improve during 1970. The accident frequency rate of 0.4 and the severity rate of 9 were the lowest since the inception of the program in 1965. This outstanding safety record is largely due to the dedication and efforts of the Bureau's Job Corps Center Directors and their staffs in providing a safe environment for the corpsmen. The record, coupled with the fact that not a single corpsman lost his life or suffered a serious injury, has to be considered one of the outstanding safety achievements of 1970. It should be reassuring to the parents of the corpsmen to know that their children are in "safe hands."

**CONTRACTOR FORCES** - During calendar year 1970, Bureau contractor employees worked 5,645,066 man-hours and experienced only 47 disabling injuries. The resulting frequency rate of 8.3 and severity rate of 1,659 were the lowest in the Bureau's history. More gratifying was the fact that only one contractor employee suffered a fatal injury, which represented another precedent or first in an impressive record of Bureau contractor safety achievement.

**TEKTITE II** - Reclamation safety engineers were selected by the Department to provide technical assistance and to administer



the onsite safety program for Tektite II, a Department of the Interior underwater research program in the Virgin Islands. This demanding and hazardous research program was completed in November 1970 with only one disabling injury, reflected in the exemplary accident frequency rate of 2.8.

MISSION SAFETY-70 - The Bureau of Reclamation was one of the few Government agencies to exceed the 30 percent reduction in accident frequency, which was the objective of Mission SAFETY-70. The Bureau completed the final year of the program with an accident frequency rate of 1.8, which represents a 36 percent reduction over the 2.8 frequency rate in 1965, the year in which Mission SAFETY-70 was begun.

OBJECTIVES FOR 1971 - In an effort to further improve the Bureau's safety record, greater emphasis will be directed toward the accomplishment of specific objectives - ZEROING IN on health and safety problems that persist in challenging our ingenuity and efforts to find a solution. This objective is compatible with the safety theme adopted by both industry and Government: ZERO IN ON SAFETY. Also, as announced last year, our programing objectives will continue to be directed toward the solution of environmentally induced problems, including the following:

Noise Control and Hearing Conservation. During 1970 the Bureau continued to improve and expand its efforts to eliminate any possibility of its employees or the public being exposed to harmful noise levels from Reclamation operations. The Commissioner of Reclamation recently authorized a revision to Reclamation Instructions Part 365 Safety formalizing the Bureau's hearing conservation program. In addition to providing for control of hazardous noise levels, employees exposed to high noise levels will undergo annual audiometric tests in order to insure that they will not suffer loss of hearing.

Physical Fitness Qualification Program. Greater emphasis will be placed upon insuring that Bureau employees are mentally and physically qualified to perform their assigned duties effectively and safely. Under consideration is a Bureau-wide physical fitness program providing for periodic physical examinations for all employees engaged in hazardous and/or arduous occupations.

Industrial Hygiene. In the course of their employment there are Bureau employees who are exposed to toxic chemicals,

hazardous materials, harmful dusts, and dangerous radiation. Bureau employees handle epoxies, acids, alkalies, and similar toxic materials. Others are exposed to toxic welding fumes, noxious gases, and solutions that can cause skin irritation and dermatitis. Radar equipment, X-ray machines, lasers, microwave systems, tellurometers, electric arc welders, and UHF radio transmitters are potential sources of radiation. In addition, there are an increasing number of chemical products such as cleaners, degreasers, etc., which are not adequately labeled to warn of the health hazard and to inform the user of the necessary precautionary measures to be taken.

While a continuing effort is made to identify and insure that these occupational hazards are controlled in the Bureau, there is more to be done. Under consideration is a Bureau-wide study to identify environmental health problems. This study would include the identification and cataloging of all known or suspect hazardous materials and products. In addition, it would provide for reliable measurement and analysis of toxicity levels and consideration of improved methods of control in order to insure a totally safe working environment for Bureau employees.

Public Safety. During 1970 a research study was completed covering the hazards to the public on Bureau waterways. As a result of this study, plans are underway to revise and expand our public safety program in order to provide more effective protection for the public.

In addition to environmental considerations, greater effort will be made in an attempt to cope with the following safety problems for which effective solutions have not yet been found:

Motor Vehicle Accidents. While the Bureau has enjoyed a comparatively good accident record - 2.6 vehicle accidents per million miles driven in 1970 - it is a fact that vehicle accidents are the greatest hazard that Bureau employees face in performing their work. As a result, a review of our present vehicle accident prevention program will be made in an attempt to devise improved driver training methods and more effective driver qualification procedures.

Contractor Safety. As announced in 1970, the Bureau is in the process of developing a 12-hour course of instruction for construction supervisors. In an endeavor to further improve the contractors' safety record, contractor foremen will be contractually obligated to complete this safety training.

Power O&M. Publication of a new safety manual, entitled "Power System Safety Standards," should improve our safety efforts in this field. A program providing for review of the new standards by all Power O&M personnel will accompany distribution of the new manual.

ZERO IN ON SAFETY - In order to meet the challenge of the 70's and to accomplish the above objectives, we must continue to make our commitment to accident-free performance the first order of business. While some of the concepts, objectives, and emphasis have changed, the method of attack remains essentially the same. In other words, if we implement established policies - maintaining the same interest and dedication as in the past - these problems will be resolved and we will maintain our exemplary safety record.

In the Bureau of Reclamation, ZERO IN ON SAFETY simply signifies a continuing consciousness, of awareness, of commitment to safety in every undertaking and at every level of management.

\* \* \* \* \*

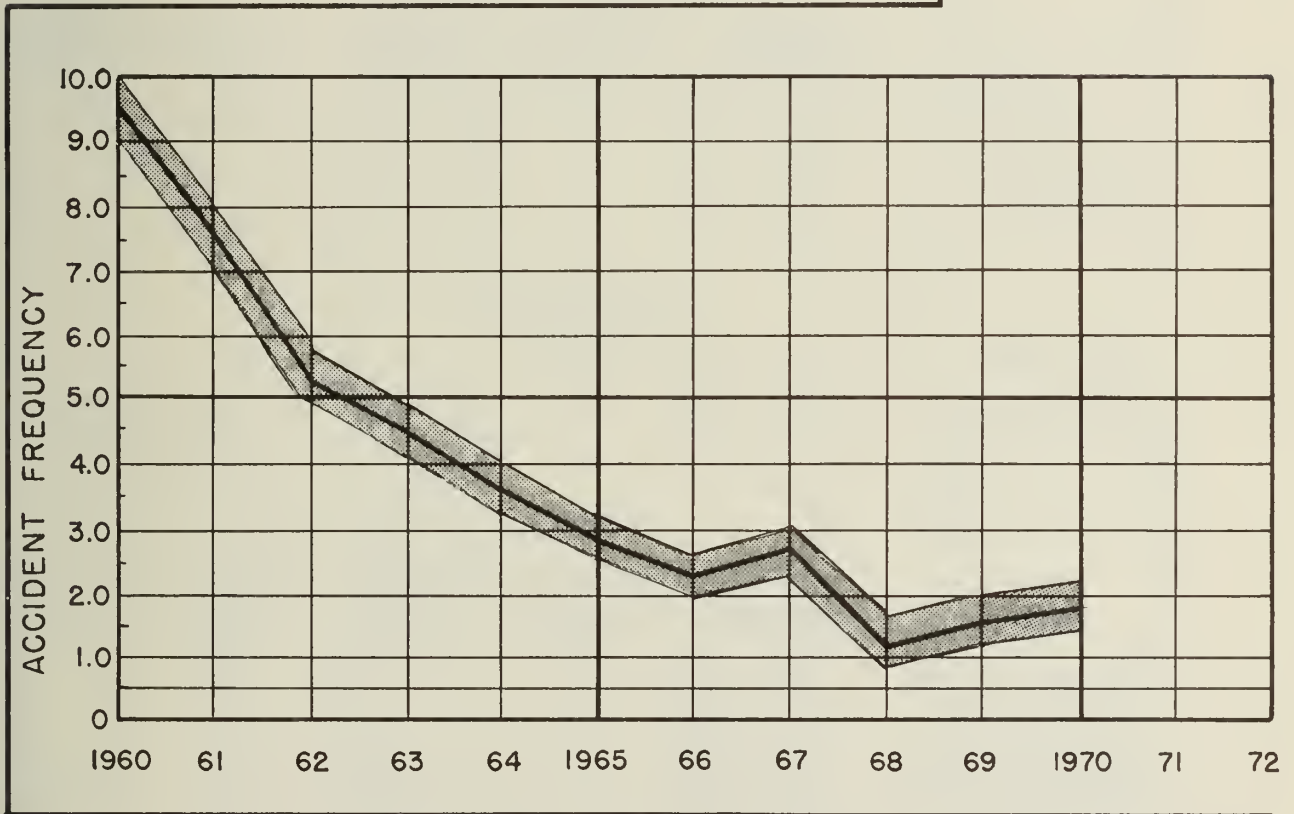
## TWO REASONS WHY YOU SHOULD DRIVE DEFENSIVELY

Today's bumpers can't take bumps. The cost to repair the damage from a 5-mph crash averages over \$200. At 10 mph it's over \$500. At 15 mph it's over \$700. Needed: crash-absorbing bumpers. The sooner, the better.

One of every 50 drivers coming your way is drunk. Not drinking - drunk. Over half the 56,000 fatalities this year will involve drunk driving.

# THE RECORD

## GOVERNMENT FORCES



The following accident statistical tabulations indicate areas of strength and weakness and should be helpful in directing our efforts to specific locations, operations, and phases of accident prevention requiring improvement.



## WORK ACTIVITY - BUREAU-WIDE

<u>Type of work</u>	<u>Man-hour exposure</u>	<u>Disabling injuries</u>	<u>Days lost</u>	<u>Frequency rate</u>	<u>Severity rate</u>
Administration	7, 872, 805	3	23	0.4	3
Construction	2, 776, 545	6	245	2.2	88
Investigation	2, 023, 924	8	180	4.0	89
Irrigation O&M	2, 053, 792	8	4, 715	3.9	2, 296
Power O&M	3, 991, 975	9	6, 436	2.3	1, 612
1970 Totals	18, 719, 041	34	11, 599	1.8	620
1969 Totals	19, 479, 994	32	13, 066	1.6	671

## ORGANIZATIONAL UNIT

### Washington Office

<u>Year</u>	<u>Man-hour exposure</u>	<u>Disabling injuries</u>	<u>Days lost</u>	<u>Frequency rate</u>	<u>Severity rate</u>
1970 Totals	599, 956	0	0	0.0	0
1969 Totals	644, 616	0	0	0.0	0

### Denver Office

1970 Totals	2, 588, 424	0	0	0.0	0
1969 Totals	2, 761, 476	2	4	0.7	1

### Region 1

<u>Major activity</u>	<u>Man-hour exposure</u>	<u>Disabling injuries</u>	<u>Days lost</u>	<u>Frequency rate</u>	<u>Severity rate</u>
Administration	611, 256	1	8	1.6	13
Construction	506, 596	1	101	2.0	199
Investigation	382, 893	0	0	0.0	0
Irrigation O&M	331, 441	2	4, 526	6.0	13, 656
Power O&M	796, 432	1	180	1.3	226
1970 Totals	2, 628, 618	5	4, 815	1.9	1, 832
1969 Totals	2, 847, 769	10	397	3.5	139

Region 2

<u>Major activity</u>	<u>Man-hour exposure</u>	<u>Disabling injuries</u>	<u>Days lost</u>	<u>Frequency rate</u>	<u>Severity rate</u>
Administration	1, 125, 205	0	0	0.0	0
Construction	626, 918	3	21	4.8	33
Investigation	526, 144	1	12	1.9	23
Irrigation O&M	632, 477	2	22	3.2	35
Power O&M	<u>641, 126</u>	<u>1</u>	<u>65</u>	<u>1.6</u>	<u>101</u>
1970 Totals	3, 551, 870	7	120	2.0	34
1969 Totals	3, 779, 789	5	45	1.3	12

Region 3

Administration	738, 688	0	0	0.0	0
Construction	587, 418	2	123	3.4	209
Investigation	191, 579	2	89	10.4	465
Irrigation O&M	119, 680	0	0	0.0	0
Power O&M	<u>879, 989</u>	<u>0</u>	<u>0</u>	<u>0.0</u>	<u>0</u>
1970 Totals	2, 517, 354	4	212	1.6	84
1969 Totals	2, 441, 627	3	300	1.2	123

Region 4

Administration	665, 957	1	3	1.5	5
Construction	297, 688	0	0	0.0	0
Investigation	270, 634	1	4	3.7	15
Irrigation O&M	40, 496	0	0	0.0	0
Power O&M	<u>423, 920</u>	<u>0</u>	<u>0</u>	<u>0.0</u>	<u>0</u>
1970 Totals	1, 698, 695	2	7	1.2	4
1969 Totals	1, 767, 095	5	98	2.8	55

Region 5

<u>Major activity</u>	<u>Man-hour exposure</u>	<u>Disabling injuries</u>	<u>Days lost</u>	<u>Frequency rate</u>	<u>Severity rate</u>
Administration	384, 383	0	0	0.0	0
Construction	180, 832	0	0	0.0	0
Investigation	230, 279	0	0	0.0	0
Irrigation O&M	696, 319	4	167	5.7	240
Power O&M	<u>79, 541</u>	<u>0</u>	<u>0</u>	<u>0.0</u>	<u>0</u>
1970 Totals	1, 571, 354	4	167	2.5	106
1969 Totals	1, 618, 377	3	92	1.9	57

Region 6

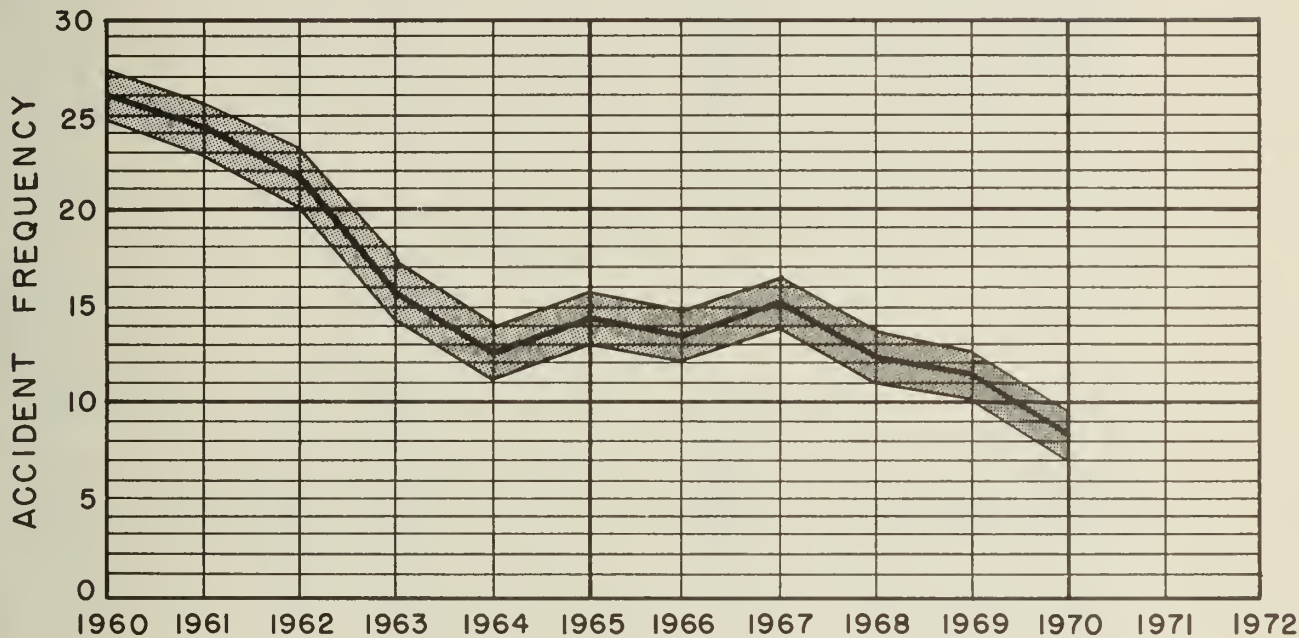
Administration	528, 680	0	0	0.0	0
Construction	267, 051	0	0	0.0	0
Investigation	261, 175	3	15	11.5	57
Irrigation O&M	123, 475	0	0	0.0	0
Power O&M	<u>568, 093</u>	<u>1</u>	<u>68</u>	<u>1.8</u>	<u>120</u>
1970 Totals	1, 748, 474	4	83	2.3	47
1969 Totals	1, 756, 829	1	10	0.6	6

Region 7

Administration	630, 256	1	12	1.6	19
Construction	310, 042	0	0	0.0	0
Investigation	161, 220	1	60	6.2	372
Irrigation O&M	109, 904	0	0	0.0	0
Power O&M	<u>602, 874</u>	<u>6</u>	<u>6, 123</u>	<u>10.0</u>	<u>10, 156</u>
1970 Totals	1, 814, 296	8	6, 195	4.4	3, 415
1969 Totals	1, 862, 416	3	12, 120	1.6	6, 508

\* \* \* \* \*

# CONTRACTOR FORCES



## WORK ACTIVITY - CONTRACTOR FORCES

<u>Type of work</u>	<u>Man-hour exposure</u>	<u>Disabling injuries</u>	<u>Days lost</u>	<u>Frequency rate</u>	<u>Severity rate</u>
Canals	923,674	14	6,202	15.2	6,714
Concrete dams	1,725,847	3	2,416	1.7	1,400
Earth dams	554,202	5	340	9.0	613
Tunnels	1,106,187	13	124	11.8	112
*Power facilities	438,458	2	26	4.6	59
Miscellaneous	896,698	10	255	11.2	284
1970 Totals	5,645,066	47	9,363	8.3	1,659
1969 Totals	6,298,647	72	20,250	11.4	3,214

\* Covers transmission lines and substations.



## ORGANIZATIONAL UNIT

### Region 1

<u>Major activity</u>	<u>Man-hour exposure</u>	<u>Disabling injuries</u>	<u>Days lost</u>	<u>Frequency rate</u>	<u>Severity rate</u>
Canals	140,853	4	31	28.4	220
Concrete dams	1,596,797	1	2,400	0.6	1,503
Earth dams	9,975	0	0	0.0	0
Tunnels	51,914	0	0	0.0	0
Power facilities	13,312	0	0	0.0	0
Miscellaneous	<u>14,198</u>	<u>0</u>	<u>0</u>	<u>0.0</u>	<u>0</u>
1970 Totals	1,827,049	5	2,431	2.7	1,331
1969 Totals	1,213,959	13	12,573	10.7	10,357

### Region 2

Canals	481,430	3	116	6.2	241
Earth dams	5,643	0	0	0.0	0
Tunnels	5,450	0	0	0.0	0
Power facilities	1,840	0	0	0.0	0
Miscellaneous	<u>225,351</u>	<u>4</u>	<u>68</u>	<u>17.8</u>	<u>302</u>
1970 Totals	719,714	7	184	9.7	256
1969 Totals	1,145,069	10	98	8.7	86

### Region 3

Canals	35,160	0	0	0.0	0
Tunnels	125,792	3	49	23.8	390
Power facilities	51,896	0	0	0.0	0
Miscellaneous	<u>468,566</u>	<u>5</u>	<u>182</u>	<u>10.7</u>	<u>388</u>
1970 Totals	681,414	8	231	11.7	339
1969 Totals	668,394	11	420	16.4	628

Region 4

<u>Major activity</u>	<u>Man-hour exposure</u>	<u>Disabling injuries</u>	<u>Days lost</u>	<u>Frequency rate</u>	<u>Severity rate</u>
Canals	10,676	0	0	0.0	0
Concrete dams	129,050	2	16	15.5	124
Earth dams	152,032	1	30	6.6	197
Tunnels	272,084	1	30	3.7	110
Power facilities	6,011	0	0	0.0	0
Miscellaneous	<u>25,466</u>	<u>0</u>	<u>0</u>	<u>0.0</u>	<u>0</u>
1970 Totals	595,319	4	76	6.7	128
1969 Totals	882,877	12	6,472	13.6	7,331

Region 5

Canals	48,054	2	26	41.6	541
Earth dams	249,082	3	125	12.0	502
Tunnels	302,803	0	0	0.0	0
Miscellaneous	<u>19,384</u>	<u>0</u>	<u>0</u>	<u>0.0</u>	<u>0</u>
1970 Totals	619,323	5	151	8.1	244
1969 Totals	1,180,832	11	474	9.3	401

Region 6

Canals	146,548	4	6,027	27.3	41,126
Power facilities	332,976	2	26	6.0	78
Miscellaneous	<u>7,311</u>	<u>0</u>	<u>0</u>	<u>0.0</u>	<u>0</u>
1970 Totals	486,835	6	6,053	12.3	12,433
1969 Totals	765,038	5	51	6.5	67

Region 7

<u>Major activity</u>	<u>Man-hour exposure</u>	<u>Disabling injuries</u>	<u>Days lost</u>	<u>Frequency rate</u>	<u>Severity rate</u>
Canals	60,953	1	2	16.4	33
Earth dams	137,470	1	185	7.3	1,346
Tunnels	348,144	9	45	25.9	129
Power facilities	32,423	0	0	0.0	0
Miscellaneous	<u>136,422</u>	<u>1</u>	<u>5</u>	<u>7.3</u>	<u>37</u>
1970 Totals	715,412	12	237	16.8	331
1969 Totals	442,478	10	162	22.6	366

\* \* \* \* \*

The Department of the Interior recently reported that some 1.5 million persons living on farms and on urban, suburban, and commercial lands - an increase of about 46,000 over 1968 - received irrigation service from Bureau of Reclamation water projects in the West during 1969.

People living on full and part-time irrigated farms totaled 585,000 in 1969, an increase of about 12,000 over 1968. This represents 27 percent of the total increase in people served.

Persons receiving irrigation water for their urban, suburban, and commercial lands totaled 886,000 in 1969, or 34,000 more than the previous year. This represents 73 percent of the total increase in people served, which is a surge largely due to the rapid encroachment of urban, suburban, and commercial development on lands that were formerly in farms.

Gross value of crops produced on Reclamation projects lands in 1969 reached \$1.9 billion, or \$220 per acre. This was the eighth consecutive year of increased gross crop value and the fourth consecutive year in which crop value exceeded \$200 per irrigated acre. Total crop value in 1969 was \$45 million, or 2.4 percent above the previous high in 1968.

Flood control benefits realized from dams and related project structures totaled \$27.7 million in 1969. Accumulated flood control benefits since 1950 amount to \$702 million.

Total revenues from electric system operations climbed to \$157.3 million in 1969, exceeding the previous year total by \$16.7 million. The amount of power marketed was 45.6 billion kilowatt-hours, an increase of 3.4 billion kilowatt-hours over 1968.

\* \* \* \* \*

# RECLAMATION JOB CORPS

## CIVILIAN CONSERVATION CENTERS

### 1970 CUMULATIVE ACCIDENT RECORD

<u>Region</u>	<u>Man-hour exposure</u>	<u>Disabling injuries</u>	<u>Days lost</u>	<u>Frequency rate</u>	<u>Severity rate</u>
Region 1	2,595,974	1	36	0.4	14
Region 2*	17,712	0	0	0.0	0
Region 4	<u>2,096,251</u>	<u>1</u>	<u>5</u>	<u>0.5</u>	<u>2</u>
1970 Totals	4,709,937	2	41	0.4	9
1969 Totals	5,800,742	10	89	1.7	15

\* Reclamation Job Corps Civilian Conservation Centers in Region 2 have been closed.

### VEHICLE ACCIDENT EXPERIENCE

<u>Region</u>	<u>No. of accidents</u>	<u>Mileage</u>	<u>Accident rate</u>	<u>Estimated damage</u>	
				<u>Government</u>	<u>Private</u>
Region 1	9	520,454	17.3	\$1,300	\$2,700
Region 2	0	10,806	0.0	0	0
Region 4	<u>6</u>	<u>387,291</u>	<u>15.5</u>	<u>590</u>	<u>211</u>
1970 Totals	15	918,551	16.3	\$1,890	\$2,911
1969 Totals	25	1,169,790	21.4	\$6,004	\$2,339

Vehicle accidents involving Job Corps staff: 2  
 Vehicle accidents involving VISTA workers: 0  
 Vehicle accidents involving corpsmen: 13

THE JOB CORPS CIVILIAN CONSERVATIONS CENTERS at COLBRAN, COLORADO, and at MARSING, IDAHO, established exemplary safety records during 1970 by completing the year without a single disabling injury.

\* \* \* \* \*



# VEHICLE ACCIDENTS

THE FOLLOWING TABLE SHOWS BUREAU VEHICLE  
ACCIDENT EXPERIENCE SINCE 1961:

<u>Year</u>	<u>No. of accidents</u>	<u>Accident rate*</u>	<u>Estimated damage</u>
1970	85	2.6	\$26,494
1969	102	3.1	24,388
1968	97	2.6	13,313
1967	117	3.1	32,582
1966	125	3.1	26,771
1965	116	2.9	23,205
1964	114	2.8	36,410
1963	134	3.4	25,130
1962	125	3.4	33,100
1961	151	4.6	41,255

\* Number of accidents per million miles driven.

THE FOLLOWING TABLE COMPARES THE VEHICLE ACCIDENT  
EXPERIENCE OF MAJOR ORGANIZATIONAL UNITS  
OF RECLAMATION FOR CALENDAR YEAR 1970

<u>Region</u>	<u>No. of accidents</u>	<u>Mileage</u>	<u>Accident rate*</u>	<u>Estimated damage</u>
Denver Office	3	405,834	7.4	\$ 225
Region 1	15	3,363,136	4.5	2,314
Region 2	16	7,218,939	2.2	9,759
Region 3	10	4,736,175	2.1	2,341
Region 4	3	3,447,301	0.9	717
Region 5	12	4,792,339	2.5	3,168
Region 6	12	4,921,008	2.4	3,682
Region 7	14	3,910,176	3.6	4,288
1970 Totals	85	32,794,908	2.6	\$26,494
1969 Totals	102	33,347,615	3.1	\$24,388

\* Number of accidents per million miles driven.

Note: Estimated damage covers only the cost of repair or replacement of the Government vehicle involved. It is estimated that over \$5,000 of the \$26,494 estimated damage in 1970 will be recovered by the Government.

\* \* \* \* \*

# ACCIDENT COSTS

Accidents do not always involve personal injury to employees but may result in the destruction or loss of property and third-party claims. Consideration and review of costs resulting from accidents is essential to the appraisal of any accident prevention program. The following summary of estimated accident costs for calendar years 1970, 1969, 1968, and 1967 is presented for this purpose.

<u>Type of accident</u>	<u>1970</u>	<u>Estimated cost</u>		<u>1967</u>
		<u>1969</u>	<u>1968</u>	
Work injuries <u>1/</u>				
Disabling injuries	\$ 36,168	\$ 39,480	\$ 29,463	\$ 39,490
Nondisabling injuries	25,740	26,580	8,320	8,464
Fatal injuries	82,512	153,388	69,931	124,144
Fires	0	30,700	350	8,362
Tort claims <u>2/</u>	166,152	22,123	186,727	148,327
Employee claims	328	423	12	-
Motor vehicle accidents	26,494	24,388	13,313	32,582
Other property damage	<u>29,099</u>	<u>122,066</u>	<u>20,410</u>	<u>6,024</u>
Totals	\$366,493	\$419,148	\$328,526	\$367,393

1/ Cost estimate based on past 5-year average cost.

2/ Tort claims resulting from accidents adjudicated during 1967, 1968, 1969, and 1970. The amount shown for 1968 has been reduced from \$361,727 to \$186,727 due to a cross-claim recently decided in favor of the Government.

The costs shown are estimated direct costs resulting from accidents.

STUDIES CONDUCTED BY COMPETENT AND  
RECOGNIZED AUTHORITIES INDICATE THAT  
INDIRECT ACCIDENT COSTS EXCEED DIRECT  
ACCIDENT COSTS BY A RATIO OF 4:1

\* \* \* \* \*

# PUBLIC SAFETY

## RECORD OF PUBLIC DROWNINGS

<u>Bureau-operated Facilities:</u>	<u>CY70</u>	<u>CY69</u>	<u>CY68</u>
Dams	0	2	0
Canals	24	27	24
Reservoirs	1	2	4
Total	25	31	28

### Facilities Operated by Others:

Irrigation and Water Districts	38	34	13
State or County (Recreational)	55	35	56
Total	93	69	69

### Summary of Total Drownings

#### During Period:

#### By Operating Agency:

Bureau of Reclamation	25	31	28
Irrigation and Water Districts	38	34	13
State or County (Recreational)	55	35	56
Total	118	100	97

#### By Type of Facility:

Dams	0	4	0
Canals	56	56	39
Reservoirs	62	40	58
Total	118	100	97

#### By Activity:

Swimming	43	28	26
Boating	16	16	21
Fishing	6	6	4
Fell into water	16	18	26
Other	37	32	20
Total	118	100	97

#### By Age:

Under 12 years of age	18	16	22
From 12 to 25	59	39	37
From 25 to 50	21	26	25
Over 50 years of age	20	19	13
Total	118	100	97

\* \* \* \* \*

# **SAFETY AWARDS**

## **COMMISSIONER'S ANNUAL SAFETY AWARD - 1970**

Presented to Region 4, Salt Lake City, Utah, in recognition of the best safety record for Government forces during calendar year 1970.

## **NATIONAL SAFETY COUNCIL AWARDS**

### **AWARD OF HONOR (1969)**

Region 2 - Sacramento, California  
Region 3 - Boulder City, Nevada  
Region 6 - Billings, Montana

### **AWARD OF MERIT (1969)**

Bureau of Reclamation - Bureau-wide  
Region 1 - Boise, Idaho  
Region 5 - Amarillo, Texas

## **NATIONAL FLEET SAFETY CONTEST (1969-1970)**

Region 4, Salt Lake City, Utah - Second Place - Passenger Car Division, Western Region Groups, Group 1.

Region 3, Boulder City, Nevada - Third Place - Passenger Car Division, Western Region Groups, Group 1.

## **DEPARTMENT OF THE INTERIOR ANNUAL EMPLOYEE SAFETY PROGRAM AWARD**

The Bureau of Reclamation received the Department of the Interior Annual Employee Safety Program Award for calendar year 1969. This was the third successive year for which the Bureau of Reclamation won the Department's highest award for excellence in the field of safety.



THE DEPARTMENT OF THE INTERIOR'S  
CERTIFICATE OF SAFETY ACHIEVEMENT AWARD - 1970

IN RECOGNITION OF OVER 1,500,000 MAN-HOURS WORKED  
WITHOUT A DISABLING INJURY:

Missouri-Souris Projects Office - Bismarck, North Dakota  
South Platte River Projects - Loveland, Colorado

IN RECOGNITION OF OVER 1,000,000 MAN-HOURS WORKED  
WITHOUT A DISABLING INJURY:

Auburn-Folsom South Unit CVP Construction Office - Auburn,  
California  
Austin Development Office - Austin, Texas  
Boulder Canyon Project - Boulder City, Nevada  
Central Utah Projects Office - Provo, Utah  
Collbran Job Corps Civilian Conservation Center - Collbran,  
Colorado  
Fryingpan-Arkansas Project - Pueblo, Colorado  
Marsing Job Corps Civilian Conservation Center - Marsing, Idaho  
Weber Basin Job Corps Civilian Conservation Center - Ogden, Utah

IN RECOGNITION OF OVER 500,000 MAN-HOURS WORKED  
WITHOUT A DISABLING INJURY:

CRSP Power Operations Office - Montrose, Colorado  
Columbia Basin Project - Ephrata, Washington  
Lower Columbia Development Office - Salem, Oregon  
Rio Grande Project - El Paso, Texas  
Sacramento Valley CVP Construction Office - Willows, California  
Snake River Development Office - Boise, Idaho  
Tracy Field Division - Tracy, California  
Upper Columbia Development Office - Spokane, Washington  
Yuma Projects Office - Yuma, Arizona

IN RECOGNITION OF OVER 1,500,000 ACCIDENT-FREE MILES:

Power Field Branch (Rio Grande Project) - Elephant Butte, New  
Mexico  
Rio Grande Project - El Paso, Texas

IN RECOGNITION OF OVER 1,000,000 ACCIDENT-FREE MILES:

CRSP Power Operations Office - Montrose, Colorado  
Lahontan Basin Projects Office - Carson City, Nevada  
Shasta Field Division - Redding, California

## IN RECOGNITION OF OVER 500,000 ACCIDENT-FREE MILES:

Fresno Field Division - Fresno, California  
Fryingpan-Arkansas Project - Pueblo, Colorado  
Las Cruces Irrigation Field Branch, Rio Grande Project -  
El Paso, Texas  
Minidoka Project - Burley, Idaho  
Southern Nevada Water Project - Henderson, Nevada  
Tracy Field Division - Tracy, California  
Upper Columbia Development Office - Spokane, Washington  
Ysleta Irrigation Field Branch, Rio Grande Project - El Paso, Texas

### Collbran Job Corps Civilian Conservation Center - Collbran, Colorado:

The photograph below shows presentation of the Department of the Interior Certificate of Safety Achievement Award by the Chief, Civilian Conservation Centers, to the Collbran Center. Center staff and corpsmen earned this award by working 1,190,405 man-hours without a disabling injury from August 1968 to May 1970. They went on to complete 1970 without experiencing a lost time injury. Shown below, left to right, are: Center Safety Officer Phillip B. Mohrman, Center Director P. Kirt Carpenter, Charles C. Butler, Chief, Civilian Conservation Centers, and Assistant Center Director James R. Rowbotham. (Photo 1077COL-434-0256)



Weber Basin Job Corps Civilian Conservation Center--Ogden, Utah: Mr. William C. Pope, Chief, Division of Safety Management, U.S. Department of the Interior, Washington, D.C., is shown below (right) presenting the Department of the Interior Certificate of Safety Achievement Award to Center Director Cleve S. Bolingbroke (center) and to Center Safety Officer Jack W. Card (left). Center staff and corpsmen earned this award by working over a million man-hours without experiencing a disabling injury. (Photo P66-D-68554)



Pictured below are Weber Basin Center staff personnel in attendance at the award presentation ceremonies. These personnel share the responsibility for the outstanding safety record. (Photo P66-D-68555)



Central Utah Projects--Provo, Utah: Region 4 Regional Director David L. Crandall (below, left) presents the Department of the Interior Certificate of Safety Achievement Award to Project Manager Palmer B. DeLong (center) and Construction Engineer A. S. D'Alessandro (right). The award was earned by employees of the Central Utah Projects working 1,020,759 man-hours without a disabling injury from September 1, 1967, to April 30, 1970. Central Utah Projects personnel went on to complete 1970 without experiencing a lost time injury. (Photo P526-D-68553)



\* \* \* \* \*



## CONSTRUCTION SAFETY AWARD - 1970

The Construction Safety Award is presented to contractors in recognition of exemplary safety records achieved while performing work for Reclamation. To be eligible, a contractor must have initiated and carried out an effective safety program during the term of his contract. He must have achieved a cumulative accident record lower than the average record obtained by all Bureau contractors during the preceding 3-year period. Equally important, he must have indicated a sincere interest in the safety of his employees by virtue of expending the time and effort necessary to carry out an aggressive and continuing safety effort. The following Bureau contractors earned Construction Safety Awards during 1970:

Capital Bridge Company - Lincoln, Nebraska  
Commonwealth Electric Company and Dominion  
Construction Company - Lincoln, Nebraska  
Clyde W. Wood and Sons, Inc. - Burbank, California  
Jelco Incorporated and Gibbons and Reed Company -  
Salt Lake City, Utah  
O.K. Mittry and Sons - Auburn, California  
Ray Kizer Construction Company and R. A. Heintz  
Construction Company - Redding, California  
R. J. Studer and Sons - Billings, Montana  
Schmidt Construction Company - Arvada, Colorado  
Seek, Inc. - Roseburg, Oregon

### Construction Safety Award

Presented to O.K. Mittry and Sons Construction Company

O.K. Mittry and Sons Construction Company was presented the Bureau of Reclamation's Construction Safety Award as a result of the safety record achieved during relocation of the Auburn-Foresthill County Road. The photograph on the following page was taken at the award ceremony. Pictured, left to right, are: Donald R. Alexander, Office Engineer; Fred J. Lasko, Safety Engineer; Darrel Hansen, Field Engineer; R. N. Mittry; G. Raymond Rolin, Project Construction Engineer, and Lucian Kandalraft, Secretary-Treasurer, O.K. Mittry and Sons. (Photo P 859 245 5903 NA)



## SAFETY PERFORMANCE RECORD

CUMULATIVE QUARTERLY REPORT  
GOVERNMENT FORCES

4th QUARTER, 1970

PERIOD FROM JANUARY 1, 1970 THROUGH December 31, 1970

REPORTING OFFICE	NUMBER OF EMPLOYEES	MAN HOURS	DISABLING INJURIES		DAYS LOST	FREQUENCY RATE	SEVERITY RATE
			CUMULATIVE THIS YEAR	CUMULATIVE THIS YEAR			
Washington Office	284	599,956					
Denver Office	1,217	2,588,424					
REGION 1							
Boise Regional Office	188	306,822	3		135	9.8	440
Central Snake Project	39	72,214					
Chief Joseph Dam	26	59,538					
Columbia Basin Project	254	758,160	1		4,500	1.3	5,935
Grand Coulee Dam Operations	309	474,625	1		180	2.1	379
Green Springs Powerplant	2	3,980					
Hungry Horse Project	44	79,752					
Lower Columbia Development Office	45	95,455					
Lower Teton Project Office	7	17,600					
Minidoka Project	68	146,178					
Snake River Development Office	49	101,668					
Third Powerplant Construction Office	211	370,236					
Tualatin Project	11	4,582					
Upper Columbia Development Office	43	80,766					
Yakima Project	29	57,042					
Totals & Averages	1,325	2,628,618	5		4,815	1.9	1,832
REGION 2							
Sacramento Regional Office	528	1,195,209					
Regional Drill Crew	26	77,172	1		12	13.0	155
Auburn-Folsom South Unit	235	463,903					
Cachuma Operations Field Branch	3	4,552					
Central Coast Dev. Field Branch	4	7,856					
Presno CVP Construction Office	138	280,537	1		8	3.6	29
Presno Field Division	143	287,016	2		22	7.0	77
Folsom Field Division	78	159,540	1		65	6.3	407
Klamath Project Office	16	34,283					
Lahontan Basin Projects Office	23	56,267					
Napa Development Field Branch		1,504					
Sacramento Valley CVP Constr. Office	109	231,706	1		5	4.3	22
San Luis Unit CVP Construction "	48	119,174					
Shasta Field Division	144	291,901	1		8	3.4	27
Solano Operations Field Branch	2	4,896					
Tracy Field Division	162	333,858					
Upper North Coast Development Field Branch, Eureka		2,496					
Totals & Averages	1,659	3,551,870	7		120	2.0	34
REGION 3							
Boulder City Regional Office	209	386,440					
Boulder Canyon Project	149	313,796					
Dixie Project Office	6	13,611					
Lower Colorado River Project	199	378,250	1		90	2.6	238
Parker-Davis Project	340	742,006					
Phoenix Development Office	107	185,760	2		89	10.7	479
Southern California Dev. Office	23	38,786					
Southern Nevada Water Project	87	193,745	1		33	5.2	170
Yuma Projects Office	142	264,960					
Totals & Averages	1,262	2,517,354	4		212	1.6	84
REGION 4							
Salt Lake City Regional Office	200	424,233					
Central Utah Projects	172	366,789					
CRSP River Operations	264	508,758	1		3	2.0	6
Curcanti Unit	75	152,484					
Durango Projects Office	28	53,775					
Grand Junction Projects Office	47	103,140	1		4	18.6	74
Logan Development Office	5	10,272					
Lyman Project Office	17	38,064					
Upper Green River	20	41,180					
Totals & Averages	828	1,698,695	2		7	1.2	4
REGION 5							
Amrillo Regional Office	97	197,325					
Albuquerque Development Office	31	66,972					
Austin Development Office	41	86,808					
Loan Program Projects Office	1	2,088					
Middle Rio Grande Project	238	464,924	4		167	8.6	359
Navajo Project	75	148,196					
Oklahoma City Development Office	23	35,873					
Pecos River Office	20	31,830					
Rio Grande Project	188	408,397					
San Juan-Chama Project	47	128,941					
Totals & Averages	761	1,571,354	4		167	2.5	106
CONSOLIDATED TOTALS							
TOTALS LAST YEAR (19 )							

\*FATALITIES INCLUDED IN TOTAL DISABLING



# SAFETY PERFORMANCE RECORD

## CUMULATIVE QUARTERLY REPORT GOVERNMENT FORCES

4th QUARTER, 1970..

PERIOD FROM JANUARY 1, 1970.. THROUGH December 31, 1970..

REPORTING OFFICE	NUMBER OF EMPLOYEES	MAN HOURS	DISABLING INJURIES		DAYS LOST	FREQUENCY RATE	SEVERITY RATE
		CUMULATIVE THIS YEAR	CUMULATIVE THIS YEAR	FATAL*	CUMULATIVE THIS YEAR	CUMULATIVE THIS YEAR	CUMULATIVE THIS YEAR
REGION 6							
Billings Regional Office	146	288,160					
Geology and Drill Crews	9	18,824	1		7	53.1	372
Canyon Ferry Project	21	36,518					
Port Peck Project	42	73,857	1		68	13.5	921
Missouri-Oahe Projects	198	401,920					
Missouri-Souris Projects	361	637,565	2		8	3.1	13
Power System Operations Office	51	105,520					
Riverton Project	4	7,389					
Yellowtail Project Office	34	72,944					
Upper Missouri Projects	51	105,777					
Totals & Averages	917	1,748,474	4		83	2.3	47
REGION 7							
Denver Regional Office	182	361,928	1		12	2.8	33
Glen Elder Unit (closed 6-30-70)		25,392					
Fryingpan-Arkansas Project	196	345,880					
Kansas River Projects	97	210,784					
Nebraska-Lower Platte Dev. Office	29	59,880	1		60	16.7	1,002
North Platte River Projects	225	493,680	4		81	8.1	164
South Platte River Projects	155	316,752	2	1	6,042	6.9	19,075
Totals & Averages	884	1,814,296	8	1	6,195	4.4	3,415



# SAFETY PERFORMANCE RECORD

## CUMULATIVE QUARTERLY REPORT

### CONTRACTOR FORCES

4th QUARTER, 1970

PERIOD FROM JANUARY 1, 1970 THROUGH December 31, 1970

REPORTING OFFICE	NUMBER OF EMPLOYEES	MAN HOURS	DISABLING INJURIES		DAYS LOST	FREQUENCY RATE	SEVERITY RATE
		CUMULATIVE THIS YEAR	CUMULATIVE THIS YEAR	FATAL *	CUMULATIVE THIS YEAR	CUMULATIVE THIS YEAR	CUMULATIVE THIS YEAR
REGION 1							
Chief Joseph Dam Project		11,475					
Columbia Basin Project	101	138,897	4		31	28.6	223
Lower Teton Project Office	7	16,465					
Minidoka Project		2,097					
Third Powerplant Construction Office	900	1,655,607	1		2,400	0.6	1,450
Yakima Project	17	2,508					
Totals & Averages	1,025	1,827,049	5		2,431	2.7	1,331
REGION 2							
Auburn-Polson South Unit	151	224,723	4		68	17.8	303
Fresno CVP Construction Office	102	196,070	2		71	10.2	362
Fresno Field Division	12	2,857					
Lahontan Basin Projects Office		7,450					
Sacramento Valley CVP Constr. Office	103	242,031	1		45	4.1	186
San Luis Unit CVP Construction "	33	41,345					
Tracy Field Division	9	5,238					
Totals & Averages	410	719,714	7		184	9.7	256
REGION 3							
Boulder Canyon Project		584					
Lower Colorado River Project	2	18,911					
Parker-Davis Project		51,841					
Phoenix Development Office	27	3,836					
Southern Nevada Water Project	377	575,900	8		231	13.9	401
Tuma Projects Office	40	30,342					
Totals & Averages	446	681,514	8		231	11.7	339
REGION 4							
Salt Lake City Regional Office	2	10,918					
Central Utah Projects	165	301,986	2		60	6.6	199
CRSP Power Operations	14	4,422					
Curecanti Unit	59	227,718	2		16	8.8	70
Grand Junction Projects Office		811					
Isman Project	15	35,540					
Upper Green River	19	13,924					
Totals & Averages	274	595,319	4		76	6.7	128
REGION 5							
Amarillo Regional Office	4	134					
Navajo Project	47	33,574	1		6	29.8	179
Pecos River Office	25	9,267					
Rio Grande Project		1,421					
San Juan-Chama Project	3	574,927	4		145	7.0	252
Totals & Averages	79	619,323	5		151	8.1	244
REGION 6							
Missouri-Oahe Projects	27	197,801	1		25	5.1	126
Missouri-Souris Projects	106	254,808	5	1	6,028	19.6	23,657
Riverton Project	7	8,025					
Upper Missouri Projects	43	26,201					
Totals & Averages	183	486,835	6	1	6,053	12.3	12,433
REGION 7							
Fryingpan-Arkansas Project	519	596,202	11		235	18.5	394
Glen Elder Unit (closed 6-30-70)		11,225					
Kansas River Projects	89	66,731	1		2	15.0	30
North Platte River Projects	31	35,454					
South Platte River Projects		5,800					
Totals & Averages	639	715,412	12		237	16.8	331
Average number of contractor employees per month during 1970: 2,858							
CONSOLIDATED TOTALS	3,056	5,645,066	47	1	9,363	8.3	1,659
TOTALS LAST YEAR(1969)	3,264	6,298,647	72	3	20,250	11.4	3,214

\*FATALITIES INCLUDED IN TOTAL DISABLING



# Don't twist your body



THE LIBRARY OF THE  
FEB 24 1971  
UNIVERSITY OF ILLINOIS  
/ T IRRANA-CHAMPAIGN

1. pull than lift

2. take steps

3. place than push

## For awkward & heavy lifts



1. to the knee

2. to the shoulder

3. push up



# *Reclamation*

# **SAFETY**

# **NEWS**

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UNIVERSITY OF ILLINOIS  
AT URBANA-CHAMPAIGN

FIRST QUARTER 1971





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Front Cover Photo: Newell B. Terry, Departmental Personnel Director, recently presented the Department of the Interior Annual Employee Safety Program Award to Ellis L. Armstrong, Commissioner of Reclamation. Photo PX-D-68746NA

SAFETY NEWS is published quarterly by the Engineering and  
Research Center, Bureau of Reclamation, Denver,  
Colorado, in the interest of accident prevention.



E. A. Lundberg  
Regional Director  
Region 3 -  
Boulder City, Nevada  
(Photo PX-D-68740NA)

During my many years with the Bureau, I have seen our safety program take on many forms leading to progressive improvement. In the early phases of our safety program, it usually was thought sufficient to take corrective measures only after an accident happened. We are still doing this of course, but now we have the foresight to anticipate hazardous conditions in our work environment. By such foresight, we have been able to prevent a substantial number of accidents, principally by writing preventive measures into our work specifications and by educating the work forces.

Accident prevention education has become our byword and it is paying off. More and more workers are "seeing the light." Once it was a problem to enforce the wearing of hardhats - today, it is accepted as part of the job uniform. In fact, you see many employees wearing hardhats while driving to and from work. The wearing of other protective devices is also coming into greater acceptance by our work forces. This voluntary acceptance has been long overdue because far too many years went by before we became genuinely concerned about safety to the public as well as safety to our workers.

Today, our projects are designed, constructed, and operated with safety as a key goal to be achieved. We must consider safety at all times and under all circumstances. We must be constantly aware of the consequences of a poor safety program and the dividends that are derived from a good one.

# BUREAU SAFETY PERFORMANCE

## 1971 CUMULATIVE ACCIDENT RECORD

January 1 - March 31, 1971

### A. GOVERNMENT FORCES

<u>Region</u>	<u>Injury index*</u>	<u>Frequency rate</u>	<u>Severity rate</u>	<u>Vehicle accident rate*</u>
Region 1	0.7	1.6	41	4.3
Region 2	1.2	2.4	52	4.2
Region 3	0.5	1.7	31	3.4
Region 4	2.8	4.8	58	2.8
Region 5	0.0	0.0	0	2.9
Region 6	0.0	0.0	0	3.4
Region 7	<u>3.5</u>	<u>6.9</u>	<u>51</u>	<u>3.6</u>
Totals to Date	0.6	2.0	30	3.9
<hr/>				
Totals 1970	11.2	1.8	620	2.6

\* Injury index is equal to frequency rate times severity rate divided by 100.  
Vehicle accident rate is the number of accidents per million miles driven.

### B. CONTRACTOR FORCES

<u>Region</u>	<u>Injury index</u>	<u>Frequency rate</u>	<u>Severity rate</u>	<u>Fatal injuries</u>
Region 1	24.9	3.7	674	0
Region 2	14.5	14.9	97	0
Region 3	4.9	6.4	76	0
Region 4	12.1	7.8	155	0
Region 5	19.4	18.0	108	0
Region 6	0.0	0.0	0	0
Region 7	<u>248.9</u>	<u>30.8</u>	<u>808</u>	<u>0</u>
Totals to Date	62.0	12.5	496	0
<hr/>				
Totals 1970	137.7	8.3	1,659	1

### C. RECLAMATION CIVILIAN CONSERVATION CENTERS

Frequency rate	0.0
Severity rate	0
Vehicle accident rate	24.4

## LOST TIME ACCIDENT ANALYSIS

Government Forces - 1971  
First Quarter

Cumulative to Date:  
March 31, 1971

### A. ACCIDENT CLASSIFICATION

<u>Description</u>	<u>No.</u>	<u>Days lost</u>
Lifting	1	21
Vehicles	3	43
Struck by object	2	44
Slip or twist	2	24
Fall	<u>1</u>	<u>2</u>
Totals	9	134

### B. OPERATIONAL SUMMARY

<u>Operation</u>	<u>Man-hours</u>	<u>No. of accidents</u>	<u>Days lost</u>	<u>Frequency rate</u>	<u>Severity rate</u>
Administration, Clerical and Design	1, 887, 206	0	0	0.0	0
Construction	687, 682	1	2	1.5	3
Investigation	438, 139	1	23	2.3	52
Power O&M	953, 014	7	109	7.3	114
Irrigation O&M	<u>502, 266</u>	<u>0</u>	<u>0</u>	<u>0.0</u>	<u>0</u>
Totals	4, 468, 307	9	134	2.0	30

## TOLL HIGH IN MISHAPS

The National Safety Council reports that an estimated 113,000 persons died in accidents in the United States last year.

The Council also estimated that 1970 accidents cost some \$26 billion and that there were approximately 10.8 million disabling injuries.

The total of fatal accidents decreased 2 percent from 1969. Motor vehicle fatalities amounted to 55,300, a decrease of 2 percent, and public nonmotor vehicle deaths were 20,000, down 5 percent. There was no substantial change either in fatal accidents in the home--27,000--or at work--14,000.

The Safety Council said there was a 7 percent increase in accidental deaths among persons 14 to 24 years of age, but that all other age groups had fewer fatalities.

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# SAFETY AWARDS

REGION 4 WINS COMMISSIONER'S 1970 SAFETY AWARD



Commissioner Ellis L. Armstrong (right) presents the Commissioner's Annual Safety Award to Regional Director D. L. Crandall in recognition of Region 4's exemplary safety record during 1970. Photo PX-D-68745NA

Region 4, with headquarters in Salt Lake City, Utah, achieved an outstanding safety record with a frequency rate of 1.2 and a severity rate of 4.0 during calendar year 1970. To achieve this record, over 800 regional employees worked 1,698,695 man-hours, experiencing only two minor disabling injuries.

## INTERIOR DEPARTMENT AWARDS CONFERRED

H. S. Latham, Chief Safety Engineer for the Bureau of Reclamation, who was the Program Safety Advisor for Tektite II, is pictured below, right, presenting Interior's Safety Council Awards of Merit to (left to right): DENNIS L. FANKHOUSER, Safety Engineer, Coulee Dam, Washington; GEORGE "DAN" WINANS, Regional Safety Engineer, Region 7, Denver, Colorado, and FRANK J. KOUBA, Regional Safety Engineer, Region 3, Boulder City, Nevada. Photo PX-D-68744NA



These Bureau safety engineers were cited in recognition of their performance and for the outstanding safety record achieved while on special assignment as on-site safety engineers to the Department's Tektite II Program, which was carried out in the Virgin Islands during 1970. Due to the nature and hazard associated with the under-seas research program, this assignment was unusually arduous and demanding. In addition to dealing with routine safety tasks, the on-site safety engineers had to cope with problems involving new and untested diving and support equipment and techniques. Their duties required close coordination and cooperation with scientific and technical personnel from numerous Government agencies, private industry,

and universities. The resulting accident frequency rate of 2.8 accidents per million man-hours worked--reflecting only one disabling injury--represents an exemplary safety achievement, particularly considering the nature of the operations and the hazards involved in the Tektite II Program.

#### MERITORIOUS SERVICE AWARD



Project Manager R. M. Sensintaffar, Casper, Wyoming, presents the Certificate of Meritorious Service Award to Charles H. Saunders, Safety Officer, North Platte River Projects. The award was in recognition of Mr. Saunders' superior performance and his dedication in promoting safety in the community.  
(Photo P144-703-4254NA)

#### NATIONAL SAFETY COUNCIL AWARDS FOR 1970

The Bureau of Reclamation won the National Safety Council's Award of Merit for 1970.

For outstanding safety performance during 1970, the following Regions of the Bureau received the National Safety Council awards indicated below:

Region 2 - Sacramento, California . . . .	Award of Merit
Region 3 - Boulder City, Nevada . . . . .	Award of Honor
Region 4 - Salt Lake City, Utah . . . . .	Award of Honor
Region 5 - Amarillo, Texas . . . . .	Award of Merit
Region 6 - Billings, Montana . . . . .	Award of Merit



DEPARTMENT OF THE INTERIOR  
CERTIFICATE OF SAFETY ACHIEVEMENT

Boulder Canyon Project - Over One Million Man-hours Without a Disabling Injury! Regional Director E. A. Lundberg is shown below presenting the Department of the Interior Certificate of Safety Achievement to Project Manager Frank D. Lord. The smiling gentlemen are, left to right: Project Safety Officer Jimmie M. Boyles, Frank Lord, Edward Lundberg, and Frank Kouba, Regional Safety Engineer. Photo PX-D-68751NA



Region 4 - Salt Lake City, Utah--Regional Safety Officer R. J. Searle Honored: Regional Director D. L. Crandall (left) and Regional Safety Officer R. J. Searle (right) are shown below with the award presented to Mr. Searle by the Federal Safety Council in recognition and appreciation for outstanding and devoted service and for valuable contributions to the promotion of accident prevention activities of the Government of the United States. PX-D-68818NA





CONSTRUCTION SAFETY AWARD  
presented to  
SCHMIDT CONSTRUCTION  
COMPANY, INC.



Region 7 Regional Director James M. Ingles (above left), with an assist from Miss Wool of Colorado, Miss Cherrie Miller, presented Mr. Don C. Hutchings, Schmidt Construction Company, Inc., with the Bureau of Reclamation's Construction Safety Award for Schmidt's zero injury record while completing a road construction contract on the Fryingpan-Arkansas Project. The occasion was the Colorado Contractors Association meeting on January 30, 1971, in Denver. Photo PX-D-68747NA

MERIT AWARDS FOR SAFETY ACTIVITIES FOR YEAR ENDING  
DECEMBER 31, 1970, PRESENTED BY  
THE ASSOCIATED GENERAL CONTRACTORS OF AMERICA

HEAVY DIVISION

Best One-Year Record

Group A - Cooperators with over 500,000 hours exposure

1. Nello L. Teer Company  
Durham, North Carolina (West Virginia Operations)
2. Nello L. Teer Company  
Durham, North Carolina (Carolinas Operations)
3. Vinnell-Dravo-Lockheed-Mannix  
Coulee Dam, Washington

Group B - Cooperators with less than 500,000 hours exposure

1. K. A. Barker Construction Co., Inc.  
Louisville, Kentucky
2. Trumbull Construction and Asphalt Company  
Pittsburgh, Pennsylvania
3. Donald G. Lambert Contractor, Inc.  
Kenner, Louisiana

Best Five-Year Record (1965-1970)

1. Munich Engineering Corp.  
Jeffersonville, Indiana
2. T. Richard Vardeman  
Nacogdoches, Texas
3. Morey Construction Company  
Parkersburg, West Virginia

Best Ten-Year Record (1960-1970)

1. T. Richard Vardeman  
Nacogdoches, Texas
2. T. J. James Construction Company, Inc.  
Miami, Florida
3. Montank and Son, Inc.  
West Los Angeles, California

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# FROM THE FIELD

## Region 1, Boise, Idaho--Region 1 Sponsors Second Annual Safety Conference:



Mr. Harold R. Gray, Project Manager, Columbia Basin Project, Ephrata, Washington, presenting session titled, "Safety on Irrigation Waterways." Photo PX-D-68743NA



Mr. Tom H. Logan, General Engineer, Denver, Colorado, who spoke on the Bureau's Noise Control Program. Photo PX-D-68741NA



Dr. John R. Marks, Director of Division of Mental Retardation and Child Development, State of Idaho, who spoke on "Safety Psychology." Photo PX-D-68742NA

Region 1 held its second Annual Safety Conference in Boise, Idaho, on January 27, 1971. The meeting was attended by the heads of all Bureau field offices in the Region as well as by all full-time and collateral duty safety officers. Regional Safety Engineers representing the other six Bureau Regions also attended the conference. The purpose of the meeting was to stimulate interest in and promote positive action concerning on-going, as well as recently adopted, Bureau accident prevention activities and programs.

Those attending the conference were welcomed by Harold T. Nelson, Regional Director. Speakers introduced by Lauren K. Simon, Regional Safety Officer, included Dr. J. Leon Sealey, Medical Director, Northwest Industrial Clinic, Seattle, Washington; Dr. John R. Marks, Director of Division of Mental Retardation and Child Development, State of Idaho; W. A. Wilson, Safety Director, J. R. Simplot Company, Pocatello, Idaho; G. D. Winans, Regional Safety Engineer, Region 7, Denver, Colorado; H. R. Gray, Columbia Basin Project Manager, Ephrata, Washington; T. H. Logan, General Engineer, Reclamation's Engineering and Research Center, Denver; and H. S. Latham, Reclamation's Chief Safety Engineer, Engineering and Research Center, Denver, Colorado.

Subjects discussed included the physical fitness qualification program; safety on irrigation waterways; the noise control program; a report on Tektite II, the Department's underwater research program, and current developments in the Bureau's safety program. Many of those attending the conference expressed the opinion that the seminar was interesting and thought provoking and generated enthusiasm for improving Bureau employees' work environment.

Auburn-Folsom South Unit CVP Construction Office, Auburn, California--Community First Aid Training: The photograph below shows Del Oro High School girls' swimming class being taught mouth-to-mouth resuscitation by Fred J. Lasko, Safety Engineer at the Auburn Office. Photo PX-D-68748NA



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# WATER SAFETY

## "OPERATION WESTWIDE"

"Operation Westwide" is a program dedicated to promoting water safety and reducing the danger of drowning through public awareness and active community participation. It provides for the exchange of information pertinent to the organization, administration, and operation of community water safety councils in areas adjacent to the numerous lakes, reservoirs, and canals in the Western United States.

Frank J. Kouba, Regional Safety Engineer, Region 3, Boulder City, Nevada, serves as a Vice President of the National Water Safety Congress. In this capacity he recommended several organizations and individuals for water safety awards. Among those recommended was the Salt River Project, Phoenix, Arizona.



Mr. Kouba (above, right) is shown presenting to Mr. F. N. Smith, President of the Salt River Project, the highest water safety award given by the National Water Safety Congress. During 1970, approximately 20,000 youngsters in the metropolitan Phoenix area took part in the Salt River Pete safety program. Through a slide show and

coloring books, Pete and his donkey demonstrate the basic water safety rules. Another part of the program is a 15-minute color movie called "Water is Fun." Each child participating in the program is asked to pledge to follow the water safety rules, help younger children learn the rules and promise not to play or swim in irrigation canals. Each receives a card and badge which identifies him or her as an official water safety agent. Photo PX-D-68749.

South Platte River Projects, Colorado: Mrs. Leona Schwab, President of the Northern Colorado Water Safety Council, is shown below presenting an award to Ted McCormick, Project Safety Officer, for his work with both youth and adult groups in "Resusci-Anne" demonstrations and school programs. Photo P245-713-4847NA



Mr. Ted McCormick, Project Safety Officer on Reclamation's South Platte River Projects, is shown (left) presenting an award to Mr. Dave Cunningham, Supervisory Illustrator, Region 7, Denver, Colorado, for the excellent art and cartoon drawings he prepared for use by the Northern Colorado Water Safety Council. Photo P245-713-4845NA



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# VEHICLE SAFETY

## NEW TIRE SAFETY REGULATIONS ANNOUNCED

A new regulation announced recently by Secretary of Transportation John A. Volpe makes tire manufacturers responsible for maintaining records of the names and addresses of customers who buy their tires so that they may easily be notified if the tires are defective.

The rule, issued by the National Highway Safety Bureau and effective May 1, 1971, sets forth the method by which manufacturers, brand name owners, and retailers will identify tires and maintain the records of the tire purchasers.

Under the regulation, tire manufacturers will label the sidewall of a tire with a serial number which indicates the date of manufacture of the tire, the name of the manufacturer, the size of the tire, and, at the option of the manufacturer, additional information describing significant characteristics of the tire.

This serial number and the name of the purchaser will be forwarded by the tire dealer after the tire is purchased.

## WHO USES SEAT BELTS?

For several years, the National Safety Council has urged auto occupants to "buckle up for safety."

The Council estimates that, if all the people in cars who were involved (during 1969) in traffic accidents had worn their seat belts, from 8,000 to 10,000 lives could have been saved. Also, the Council estimates that 2,700 to 3,300 lives were saved during that year, because auto occupants involved in traffic crashes were wearing their seat belts.

So . . . who uses seat belts? Studies show that older drivers use the belts more often than young drivers; male drivers more than female drivers, and more are used by drivers on super-highways than those on city streets.

SO . . . FASTEN THAT SEAT BELT . . . YOUR LIFE MAY BE ONE THAT WILL BE SAVED!

\* \* \* \* \*



## "ZERO-IN" ON SAFETY

Remarks by H. S. Latham, Chief, Division of Safety,  
Bureau of Reclamation - Safety Management Confer-  
ence - Fryingpan-Arkansas Project, Pueblo,  
Colorado - March 24, 1971

Before discussing future programming objectives, I believe we should take a few minutes and look back down the road we've traveled. In looking back and in summing up the accomplishments of the past 10 years, I believe we can say "You've Come a Long Way Baby."

A decade ago - as 1961 dawned - the Bureau had every cause to reflect soberly on yet another in a long series of disappointing safety records. During 1960, 187 Bureau employees suffered disabling injuries and 5 were fatally injured in job-connected accidents. With an accident frequency rate of 9.6 and a severity rate of 1,732, Reclamation had one of the poorest records in Government. Reflect and compare this with the current achievement of 1970: 34 disabling injuries, including one fatality, resulting in a frequency rate of 1.8 and a severity rate of 620.

Also, in what some of us fondly recall as the "good old days," many Bureau contractor employees and their families certainly had reason to doubt this claim of "the good times." Over 300 construction workers were injured, 16 of them fatally, while working on Bureau contracts during 1960. The contractors' accident frequency rate was 25.9 and their severity rate was 9,232.

The Bureau's safety record was a disaster - an adventure in futility. Our accident prevention efforts were ineffective and consisted principally of paying lip service to safety. It was evident we hadn't ZEROED IN ON SAFETY.

In 1961 Reclamation finally ZEROED IN ON SAFETY. Without replaying the game, I'll simply restate the game plan and review a few of our more significant accomplishments of the past 10 years. In addition to establishing a safety policy with specific objectives, we initiated a management concept - call it systems safety management - which integrated safety into all Bureau activities and management decisions - placing the same emphasis on safety as on other administrative matters. The game plan required the active involvement and participation of all Bureau supervisors in the implementation of the safety program - with the result that active concern for the health and safety of our employees, contractor employees, and the public became the "modus operandi."



The results were truly spectacular. Since 1961 we have enjoyed a continuing improvement in the Bureau's safety record - with exemplary annual safety records since 1962. Today, instead of having the worst safety record in Government, we enjoy one of the best records. Along the way we earned national recognition for excellence in safety, including the National Safety Council's Award of Honor in 5 of the past 7 years. Reclamation was one of the few Government agencies to exceed the 30 percent reduction in accident frequency, which was the objective of Mission SAFETY-70. Last year's frequency rate of 1.8 represents a 36 percent reduction as compared with our 1965 rate of 2.8 when Mission SAFETY-70 was announced.

Equally gratifying is the current contractor frequency rate of 8.3, representing a 37 percent improvement over 1969. Last year was the first year in which Bureau contractors completed a year's work with only one fatality.

To sum it up - all phases of our safety effort have improved and our safety record is outstanding. As a result, the Bureau and its employees are enjoying the many real and tangible benefits accruing from a good safety record. Yes - "You've Come a Long Way Baby."

Okay - so much for the past. Are we going to be able to maintain our momentum and continue to be recognized as leaders in providing a safe environment for our employees, contractor employees, and the public? Today the old concepts of safety are undergoing drastic change, and there are new challenges. Today it isn't enough to just prevent accidents. The public is very much aware of the dangers of air pollution, water pollution, unsafe products, radiation hazards, occupational disease, and hazardous materials; and we have the responsibility of coping with these problems. In fact, it is evident with the enactment of environmental legislation, the Construction Safety Bill, and the Occupational Health and Safety Act, that the pressure is on. Both of the Federal health and safety bills enacted in 1969 and 1970 emphasize environmental aspects of industrial safety and contain provision for control of occupational disease and harmful noise levels. In fact, it looks as if it could be a whole new ball game!

As a result, our safety programing objectives for the 70's will be directed toward aiding in the solution of man's environmental problems. The following environmental-safety programs are currently being implemented Bureau-wide:

1. Noise Control and Hearing Conservation. - A program to eliminate any possibility of either our employees or the public being exposed to harmful noise levels.

2. Physical Fitness Qualification Program. - Periodic medical examinations to insure that Bureau employees are physically able to perform their assigned duties effectively and safely.

3. Industrial Hygiene. - Coping with the problems of toxic chemicals, hazardous materials, harmful dusts, and exposure to radiation.

4. Public Safety. - Insuring a safe environment for the public in the development and management of all Bureau projects.

If we are going to meet the challenge of the 70's and resolve the environmental problems discussed, it is evident that safety is going to continue to be the order of business in Reclamation. Fortunately, although some of the concepts, objectives, and emphasis have changed, the method of attack remains essentially the same. In other words, if we continue to implement established policies - maintaining the same interest and dedication as in the past - these problems will be resolved and we will continue to enjoy an exemplary safety record.

ZERO IN ON SAFETY - popularized by both industry and the administration - perfectly describes our accident prevention policy and is an excellent promotional tool. However, it should be emphasized that the term - at least in the Bureau - describes the method of attack and not the target. For example, it certainly isn't news that automobile accidents are the nation's gravest safety problem. Likewise, it is no secret that most job injuries result from slips and falls, handling materials, and by employees being caught in or between objects. Merely identifying injury sources does not constitute a safety program - nor will it get the job done. The record clearly proves this - vehicle accidents and the industrial injury sources mentioned still plague us - and in spite of our efforts will continue to take top billing statistically.

To be effective, ZERO IN ON SAFETY has to be interpreted to mean that safety is the first order of business and is considered an inseparable part of operational policy and procedure; that all supervisors understand that safety is their responsibility; that safe operating procedures and safety standards will be developed and applied to all activities and firmly enforced; that organizations employ competent career safety personnel, and that adequate funds are provided to conduct an effective safety effort. To sum it all up, in order to ZERO IN ON SAFETY, management must put its efforts and its money where its mouth is! Slogans and lip service won't make the scene.

Fortunately, we know how to administer an effective safety program - and have the record to prove it. Finally, as supervisors who desire to ZERO IN ON SAFETY, I'd like to leave you with the following criteria with which you can measure your individual safety performance:

One absolutely vital prerequisite is that of consciousness, of awareness, of commitment to safety at every level of management. You must be committed to the challenge of accident-free performance and possess a desire to achieve an exemplary safety record. I sincerely believe that Reclamation has been favored by such an executive attitude - reflected by most Bureau supervisors.

You must set priorities for safety performance in the same manner as you set other priorities. If your accident frequency rate rises or remains on a plateau, you must determine why and take appropriate action to improve the situation. Safety personnel can help you identify the problem areas - but the responsibility for action is yours - not theirs.

You should carefully consider the applicant's health and physical qualifications prior to employment. You should also arrange for medical checkups if you have reason to suspect that an employee's health or physical condition could endanger the employee or others.

When you hire a new employee or reassign an employee to another job, you should make sure he is capable of performing the job safely and will observe the safe work practices. All employees should receive safety indoctrination and be thoroughly checked out on the job.

You should arrange safety training for specialized or hazardous operations, including provision for retraining.

You should personally attend and participate in safety meetings, seminars, and safety training courses.

You should be thoroughly familiar with the safety requirements and procedures for activities under your control and insure yourself that they are being observed.

If you're a line supervisor, you should personally investigate all accidents under your immediate jurisdiction, determine the cause, and take prompt corrective measures. Supervisors - line and staff - should review the reports of all accidents occurring in their sphere of influence.

You should regularly cover safety when reviewing operations or work assignments with your employees.

You should consider an employee's safety attitude and his accident experience when you consider him for promotion.

Finally, you must set an example by observing the safety standards and safe practices yourself.

It all adds up to this: It's in your hands, and the record will depend upon how effectively you ZERO IN ON SAFETY.

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#### COLORADO PROJECT STARTS PAYING OFF

The Federal Government has received \$18.5 million from the Colorado River Storage Project, including the first major repayment on the investment, the Interior Department has announced.

Ellis L. Armstrong, Commissioner of Reclamation, said the annual report of the project for fiscal year 1970 showed it paid \$18,554,515 to the Federal treasury, including \$13,695,366 applied to interest and \$4,859,149 "comprising the first major repayment of the principal investment."

The project and other participating projects in Arizona, Colorado, New Mexico, Utah, and Wyoming were authorized in 1956.

"The year 1970 was the first in which all interest was paid, including deferred interest which had accrued, and a significant amount was applied on the investment principal," Armstrong said.

Sale of power from the project's generating facilities rose 24 percent during the fiscal year to \$24,497,600, pushing the overall total power sales since their start in 1963 to over \$100 million.

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## THE EFFECT OF ALCOHOL AND OTHER STRESSES ON SAFETY

Talk presented by Capt. C. A. Buckhart, MC, USN,  
Staff, COMSUBLANT, Norfolk, Va., at the Navy  
East Coast Regional Safety Conference

It is doing what we feel like doing, rather than doing what we know is proper and safe that gets people into trouble. What, then, makes man do wrong things?

To any type of idea there are 2 basic types of acceptance:

1. Intellectual acceptance. - The individual accepts an idea for its objective value.
2. Emotional acceptance. - The idea is perceived but distorted by emotional attitude.

A third type of acceptance might be considered:

3. Confused acceptance. - In the case of multiple ideas of conflicting value, intelligence or emotion will prevail in the end.

The normal individual accepts a dangerous situation with an intelligent reaction to act accordingly in order to protect or promote his own well-being. This reaction is a healthy fear and respect of danger. Safety factors I will discuss distort or eliminate intelligent reaction. They influence the individual such that respect for danger is lost, distracting or confusing him in the presence of danger or causing an emotional reaction that overwhelms his intelligence.

Bear in mind that, although we are primarily concerned with safety, these same factors also affect work performance and may be dysfunctional to society. Where alcohol, drugs, or fatigue may contribute to an accident and loss from work, they also cause diminished efficiency and reduced work performance.

Therefore, contributions to accidents and decreased work performance are essentially synonymous.

## ALCOHOL

Since the dawn of history people have consumed varied forms of alcohol for the pleasure of taste and the effect it produces. Under its influence, inhibitions are relaxed. As a result, moods are expanded, confidence is boosted, problems of the day seem less acute, and friendships are easier to form. No doubt, many

problems of the world have been easier to solve as the sedative effect of alcohol soothed the brain.

Conversely, alcohol is a major problem of our society. Drinking is indicated as a factor in at least half the fatal motor vehicle accidents. One report stated that drinking has contributed to 37 percent of all violent deaths in a typical U.S. community. Routine reports do not show this same frequency of association, but routine reports are believed to understate the frequency. The necessary time and equipment are simply said to be inadequate to perform alcohol tests on all persons involved in accidents.

The most important organ of the body acted upon by alcohol is the brain. The psychic phenomena which follow ingestion arises from an inhibition or depression of higher mental processes, especially those controlling intelligent reactions depending upon training and experience and which usually make for sobriety and self-restraint. As the amount consumed increases, finer grades of discrimination, memory, concentration, and insight are dulled and then lost. Although the individual often estimates his own performance as greatly improved, actual measurement shows it to be inferior. Psychometric tests of mechanical skills, as well as complicated mental problems, have uniformly revealed decreased efficiency with even small doses. The individual under the influence of alcohol is a poor and unsafe performer in the Navy environment where alertness is a perpetual requirement. As Admiral McDonald, who was Chief of Naval Operations, said, "When alcohol takes command over an individual he loses his effectiveness to the organization."

Even one average drink will cause brain dysfunction which may or may not be apparent, depending upon how much the individual has been in the practice of consuming. The nondrinker may be staggering when his blood-alcohol level exceeds little over 150 mgm %; the chronic alcoholic may float through an entire day with a level of 300 mgm % and appear normal to observers. The effective threshold of blood level increases with the amount habitually consumed and results in increased tolerance. Because of this fact, we cannot always relate the quantity of alcohol consumed nor the level of alcohol in the blood with the degree of dysfunction. However, we do know the following events occur:

The human being can metabolize about an ounce of alcohol every 2 hours. When an average drink is ingested, a measurable blood level is attained within 15-20 minutes and reaches a peak at the end of the first 1 to 1-1/2 hours depending upon associated food intake. By the end of the second hour the blood

level starts down and is normal within 12 hours. (If larger doses are taken, the peak level will be higher and last longer. Subsequent drinks affect the blood level in an additive manner.) No matter how large the dose, all blood alcohol will normally be gone within 24 hours of the last drink.

Most people presume that alcohol-induced accidents take place during the first few hours after drinking. There is another phase, however, that requires our serious consideration where safety is concerned.

Like all sedatives, alcohol first works on the cerebrum and cerebellum; hence the drinker is high and has lost some sense of equilibrium. When the cerebrum is depressed, the psychomotor activity is diminished. He is relaxed, less anxious, less frightened, and less worried. As soon as the blood alcohol level starts to fall the sedative effect is lost. Rather than go back to where he was before, a second phenomenon appears--the psychomotor activity level increases. Around the end of the second hour after the last drink an agitating effect starts to gather momentum and the individual is more tense than he was before he drank at all. This agitating effect lasts from 12-24 hours after a single bout of heavy drinking. If, however, an individual has been drinking heavily for several days, it may take another several days for the psychomotor activity to return to its normal state. We recognize this agitation state as a "hang-over" and in the more serious form as "D. T. s."

Very little is known about the proportion of accidents that may be attributed to hangovers. Neither are field studies available to document its influence upon work performance. Blood level studies are not applicable and it is as yet impractical to apply the laboratory studies that would be essential. Other data is hard to come by and rarely sought because of poor understanding of the problem. However, common knowledge tells us that the hangover victim is incapable of normal mental and physical function. We must assume that hangovers are responsible for many of our accidents and are the basis for many management decisions and much poor work performance, although investigators of accidents are not always alert to this potential.

Chronic alcoholism is another issue facing military personnel with alarming frequency. Its cost to the Government (which is inestimable) includes time invested in training and experience, hospitalization, accidents, errors in judgment and substandard performance, disciplinary action, absenteeism and pensions for secondary disorders. Fortunately, we are beginning to recognize the problem for what it is and to take positive steps to aid the individuals while the disease is treatable.

Alcohol is truly an addicting drug. The alcoholic becomes addicted because of his compulsivity. He is compelled to drink partly to avoid the agitation of the withdrawal of alcohol and in part due to either psychological or biochemical reasons we do not understand. Some alcoholics can drink a quart of liquor a day and still function in mechanical fashion. In fact, his agitation or psychomotor level from past drinking is so high that he requires a heavy load just to bring him to a relatively normal psychomotor level. His blood level is so high that in most people anesthesia would result. There is one difference--tomorrow he probably will be amnesic for the event. This is called a "blackout." People get these quite soon after they start drinking in an alcoholic fashion. It is not simply that the individual forgets what he was doing; even while he was doing it his consciousness was clouded and he did not consciously know what he was doing. The alcoholic may have detectable brain damage long before other behavior changes are manifested. He cannot avoid brain damage. He is hazardous to himself and others behind the wheel, at work, or in any dangerous situation even when sober. Early assistance is a means of averting accidents and personal tragedy.

I make a plea for seniors to be objective when the early stages of alcoholism or the potential alcoholic is recognized. The common procedure of ignoring or covering up for the afflicted man leads to an inevitable greater cost risk when there is little hope for rehabilitation. Ironically, the well-meaning senior who does so is performing an injustice to the welfare of the individual and the Navy.

\* \* \* \* \*

## ALCOHOLISM

Public Law 91-616 requires the Civil Service Commission to assume responsibility, in cooperation with the Secretary of HEW and the heads of other Federal agencies, to develop and maintain appropriate policies and services for the prevention and treatment of alcohol abuse and alcoholism among Federal civilian employees. Except in CIA, FBI, NSA and other designated agencies, the law also prohibits the denial or deprivation of Federal employment solely because of prior alcohol abuse or alcoholism. The law does not prohibit the dismissal of an employee who cannot properly perform the duties of his job.

\* \* \* \* \*



## HOW WOULD YOU TRAILER IT ?

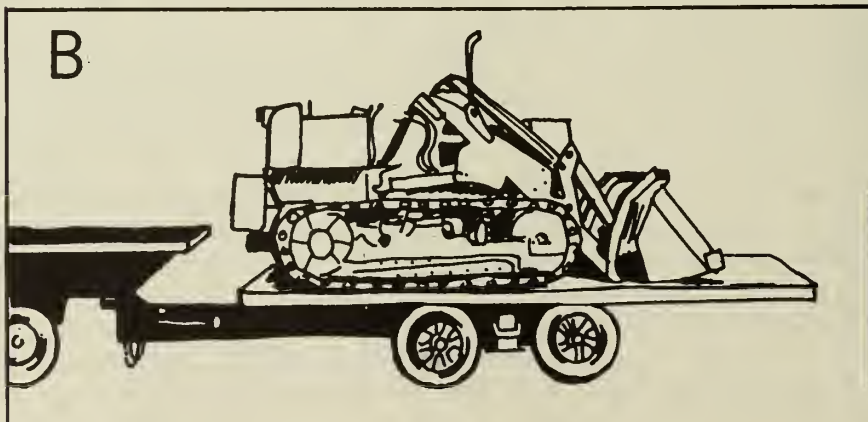
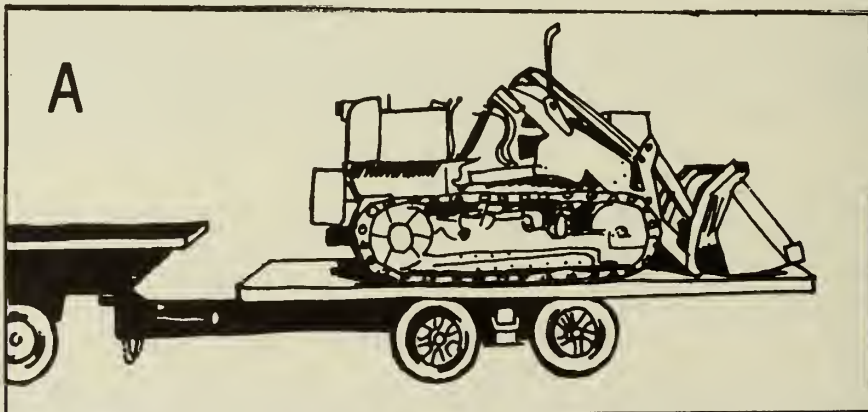
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issue of WORLD CONSTRUCTION.

Correct distribution of the load on the bed of a tilting deck trailer is necessary for moving equipment from site to site safely and speedily.

In Illustration A below, almost all of the weight of the crawler loader rests squarely on the wheels of the trailer with practically no down pressure on the hitch at left.

In Illustration B, the loader is up closer to the hitch and most of the weight is over the forward set of trailer wheels. Which is right?

According to the Miller Trailering Guide, a tilting deck trailer is properly loaded when about 15 percent of the weight of the load is borne by the hitch. This gives the tow truck greater traction and makes it easier for the driver to brake and handle the load. The right way to carry the load is B.



\* \* \* \* \*

## IS YOUR OFFICE REALLY AS SAFE AS YOU THINK ?

One State Industrial Commission has reported that office accidents in that state claimed the lives of five office workers during the year, partially disabled two others for life, and caused temporary disabilities for 485 workers.

Six trouble areas where most office accidents and injuries occur are listed below.

1. Housekeeping. Poor housekeeping is the most common cause of office accidents. Thirty-five percent of reported disabling injuries are the result of falls, mainly because of poor housekeeping.
2. Floors. The condition of the office floor may be hazardous. Spilled liquid should be cleaned up immediately. Liquid spilled on floor tile greatly increases the possibility of slipping and falling. About 25 percent of reported accidents in offices resulted from this hazard.
3. Stairways. Stairways adjacent to offices should be carefully watched and kept clean at all times. Use the handrails and walk, don't run, up or down the stairs.
4. Electrical equipment. All offices have some form of electrical equipment, ranging from air conditioners to adding machines. Pay attention to the cords; report promptly any defective or frayed extension cord or plug so that it can be repaired.
5. Filing equipment. Office files are dangerous when improperly used. Pulling out several drawers in one file cabinet can cause the entire cabinet to fall. Always be alert for pinched fingers when you close the drawer. Avoid leaving a drawer open any longer than necessary.
6. Ladder substitutes. Another common cause of office injuries is using substitutes for a ladder. Chairs with wheels or rollers are unsafe to stand on to reach high places because they can suddenly slip or overturn causing a fall. Using inverted wastebaskets, open file drawers, and even desk tops should also be discouraged as ladder substitutes.

\* \* \* \* \*

It is a good idea most of the time to mind your own business, but don't forget--Safety is everybody's business!

\* \* \* \* \*

## SPRING . . . CLEANUP TIME

Each spring a period known as "Spring Cleanup Time" is set aside to put things in good order. Take a quick look around your work area and corridors. Do you see any accumulation of trash, excess or unneeded equipment or material, or evidence of poor housekeeping?

Not only are these conditions a hindrance to safe working conditions, they are unsightly and often fire hazards. An "All Hands" effort is necessary to get things in "shipshape" order--and to keep it that way.

Each employee should--

- Check his desk, workbench or area, and storage spaces for orderliness and to determine what can be done to eliminate unnecessary hazards.
- Inspect electrical cords and outlets to assure that they do not become fire hazards by use of badly worn cords or by overloading circuits.
- Do not carelessly dispose of flammable substances.
- Examine hallways to assure that they are not crowded with boxes--or junk--that should properly be moved to a storage area or discarded.
- Are there grease or water spots on the floor that could be slipping hazards?

Not only should office and shop areas be checked for good housekeeping. How about around your house?

- Do you have your heating system cleaned and checked regularly?
- Where do you store oily rags and waste?
- How often do you leave things lying on the basement steps--not even thinking of the hazard created?

Take pride in the appearance of your office, shop, activity or home and become an active member of this year's Spring Cleanup Program!

\* \* \* \* \*

## DESERT SURVIVAL

The recent happenings in our Southwest desert prompted the thought that a repetition of a few basic rules on desert survival might be in order. This is not intended to cover extended trips, but rather to hopefully be of some value in a situation where you unexpectedly find yourself "stranded" or lost in the desert.

Of first and foremost importance - never go into the desert even on a paved road without a good supply of water. Plastic containers of the bleach bottle, gallon-milkjug type are the best all-purpose containers.

From the Civil Defense Survival Handbook:

ALWAYS, before going into the desert, inform a relative or neighbor exactly where you are going and when you will return.

If planning to drive cross country or on little used trails, be sure you have proper tools and equipment: one or more shovels, a pick-mattock, a tow chain or cable, at least 50 feet of 1-inch manila rope, tire pump, axe, water cans, gas cans (both filled), and, of course, your regular spare parts and auto tools. Be sure that your car is in sound condition with a full gas tank, a filled clean radiator, a filled battery and new fan belts. A survival kit should also be a part of your equipment. If unfamiliar with desert driving, practice "difficult traction" in a dry wash with another car standing by to tow you out if you become stuck.

If you think you are lost or become stuck in a dry wash, etc., DO NOT PANIC. Remember, move with a purpose, never start out and wander aimlessly. It may be best to stay right where you are and let your companions or rescuers look for you.

SIGNALS: The best signals are fire - a large bright one at night, a smoky one by day, black smoke if the country is light colored, white smoke if the country is dark. Maintain a good supply of fuel to give the appropriate signal. Build your signal fire on the highest point near to your shade or shelter. If fuel is plentiful, two fires are better than one.

Aluminum foil is excellent signaling material if you have it.

RATION SWEAT, NOT WATER. In hot deserts you need about a gallon of water a day. If you walk at night you may get about 20 miles for that gallon, but if you walk in the daytime heat, you will get less than 10 miles to the gallon.



Keep your clothing on, including shirt and hat. Clothing helps ration your sweat by slowing the evaporation rate and prolonging the cooling effect. It also keeps out the hot desert air and reflects the heat of the sun. Stay in the shade during the day. Sit on something 12 or more inches off the ground, if possible.

Do not lie on the ground as it can be 30 degrees hotter than a foot above the ground. If travel is indicated or necessary, travel slowly and steadily.

Rationing water at high temperatures is actually inviting disaster because small amounts will not prevent dehydration. Loss of efficiency and collapse always follow dehydration. IT IS THE WATER IN YOUR BODY THAT SAVES YOUR LIFE, NOT THE WATER IN YOUR CANTEEN.

KEEP THE MOUTH SHUT AND BREATHE THROUGH THE NOSE to reduce water loss and drying of mucous membranes. AVOID CONVERSATION for the same reason. If possible, cover lips with grease or oil. ALCOHOL IN ANY FORM IS TO BE AVOIDED as it will accelerate dehydration. Consider alcohol as food and not as water since additional water is required to assimilate the alcohol. For the same reason, food intake should be kept to a minimum if sufficient water is not available.

In a survival situation everything that you do, each motion that you make, and each step you take must be preceded by the thought: Am I safe in doing this?

\* \* \* \* \*

#### MORE EYE PROTECTION NEEDED

A chemical operator's eyes became irritated after some benzene splashed behind his safety glasses. He used an eye-wash fountain immediately after the splash, but irritation developed about an hour later.

The operator was using an air-operated drum pump to transfer benzene, and the pump plugged. When he struck the exposed ball check valve on the bottom of the pump to unplug it, benzene trapped under pressure in the pump sprayed out.

Preventive Measures: (1) Protective equipment must be adequate for the job. Safety glasses, which are minimal protection for all chemical work, should have been supplemented by a face shield or chemical goggles. (2) Whenever clearing a plug from any system which has been pressurized, it is wise to anticipate a momentary surge with the resultant spray or splash, and to choose protection with this in mind.

\* \* \* \* \*

# SAFETY PERFORMANCE RECORD

## CUMULATIVE QUARTERLY REPORT GOVERNMENT FORCES

1st QUARTER, 1971

PERIOD FROM JANUARY 1, 1971 THROUGH March 31, 1971

REPORTING OFFICE	NUMBER OF EMPLOYEES	MAN HOURS	DISABLING INJURIES		DAYS LOST	FREQUENCY RATE	SEVERITY RATE
		CUMULATIVE THIS YEAR	CUMULATIVE THIS YEAR	FATAL *	CUMULATIVE THIS YEAR	CUMULATIVE THIS YEAR	CUMULATIVE THIS YEAR
Washington Office	276	142,512					
Denver Office	1,224	613,036					
REGION 1							
Boise Regional Office	187	85,447					
Central Snake Project	39	18,815	1		26	53.1	1,382
Chief Joseph Dam	26	13,542					
Columbia Basin Project	249	124,736					
Grand Coulee Dam Operations	303	160,951					
Green Springs Powerplant	2	922					
Hungry Horse Project	44	17,034					
Lower Columbia Development Office	44	19,456					
Lower Teton Project Office	7	3,158					
Minidoka Project	68	35,715					
Snake River Development Office	46	24,560					
Third Powerplant Construction Office	217	93,499					
Tualatin Project	11	4,943					
Upper Columbia Development Office	40	17,338					
Yakima Project	30	13,129					
Totals & Averages	1,313	633,245	1		26	1.6	41
REGION 2							
Sacramento Regional Office	531	288,516					
Regional Drill Crew	22	11,072	1		23	90.3	2,077
Auburn-Polsom South Unit	232	116,550					
Cachuma Operations Field Branch	3	1,488					
Central Coast Dev. Field Branch	4	1,920					
Presno CVP Construction Office	133	68,710					
Presno Field Division	142	70,432					
Polsom Field Division	79	40,624					
Klamath Project Office	16	8,185					
Lahontan Basin Projects Office	23	11,408					
Sacramento Valley CVP Constr. Office	100	49,620					
San Luis Unit CVP Construction Office	47	22,810					
Shasta Field Division	141	71,405	1		21	14.0	295
Solano Operations Field Branch	2	992					
Tracy Field Division	162	79,464					
Totals & Averages	1,637	843,196	2		44	2.4	52
REGION 3							
Boulder City Regional Office	175	89,920					
Boulder Canyon Project	145	74,173					
Dixie Project Office	5	2,744					
Lower Colorado River Project	180	90,320					
Parker-Davis Project	338	160,414	1		18	6.2	112
Phoenix Development Office	100	48,480					
Southern California Development Off.	20	8,553					
Southern Nevada Water Project	81	41,469					
Yuma Projects Office	139	66,880					
Totals & Averages	1,183	582,953	1		18	1.7	31
REGION 4							
Salt Lake City Regional Office	201	106,917					
Central Utah Projects	175	87,443					
CRSP Power Operations - Montrose	264	130,893	2		24	15.3	183
Durango Projects Office	28	14,899					
Grand Junction Projects Office	118	57,156					
Logan Development Office	5	2,560					
Logan Project Office	17	7,965					
Upper Green River	20	9,440					
Totals & Averages	828	417,271	2		24	4.8	58
REGION 5							
Amarillo Regional Office	98	49,397					
Albuquerque Development Office	31	17,080					
Austin Development Office	41	20,992					
Loan Program Projects Office	1	512					
Middle Rio Grande Project	240	134,337					
Mountain Park Project	2	160					
Navajo Project	75	36,343					
Oklahoma City Development Office	21	9,364					
Pecos River Office	20	9,551					
Rio Grande Project	182	84,726					
San Juan-Chama Project	40	22,112					
Totals & Averages	751	384,574					
CONSOLIDATED TOTALS							
TOTALS LAST YEAR (19 )							

\*FATALITIES INCLUDED IN TOTAL DISABLING

GPO 841-655

# SAFETY PERFORMANCE RECORD

## CUMULATIVE QUARTERLY REPORT

### GOVERNMENT FORCES

1st QUARTER, 1971

PERIOD FROM JANUARY 1, 1971 -- THROUGH -- March 31, 1971 --

[illegible]



# SAFETY PERFORMANCE RECORD

## CUMULATIVE QUARTERLY REPORT

### CONTRACTOR FORCES

1st QUARTER, 1971

PERIOD FROM JANUARY 1, 1971... THROUGH... March 31, 1971..

REPORTING OFFICE	NUMBER OF EMPLOYEES	MAN HOURS	DISABLING INJURIES		DAYS LOST	FREQUENCY RATE	SEVERITY RATE
		CUMULATIVE THIS YEAR	CUMULATIVE THIS YEAR	FATAL *	CUMULATIVE THIS YEAR	CUMULATIVE THIS YEAR	CUMULATIVE THIS YEAR
REGION 1							
Columbia Basin Project	162	55,624	1		60	18.0	1,079
Third Powerplant Construction Office	1,297	474,636	1		300	2.1	632
Yakima Project	23	4,260					
Totals & Averages	1,482	534,520	2		360	3.7	674
REGION 2							
Sacramento Regional Office	107	25,333					
Auburn-Folsom South Unit	251	56,491	2		13	35.4	230
Fresno CVP Construction Office	92	15,469					
Fresno Field Division	8	2,339					
Klamath Projects Office		180					
Sacramento Valley CVP Constr. Office	32	12,068					
San Luis Unit CVP Construction Off.	40	18,911					
Tracy Field Division	5	3,194					
Totals & Averages	535	133,985	2		13	14.9	97
REGION 3							
Lower Colorado River Project	7	2,145					
Phoenix Development Office	6	171					
Southern Nevada Water Project	330	136,523	1		12	7.3	88
Yuma Projects Office	46	18,610					
Totals & Averages	389	157,449	1		12	6.4	76
REGION 4							
Salt Lake City Regional Office	6	3,517					
Central Utah Projects	164	101,737					
Grand Junction Projects Office	39	16,785	1		20	59.6	1,192
Lyman Project	12	6,919					
Totals & Averages	221	128,958	1		20	7.8	155
REGION 5							
Navajo Project	93	39,925	1		6	25.0	150
Pecos River Office	14	5,984					
San Juan-Chama Project	22	9,581					
Totals & Averages	129	55,490	1		6	18.0	108
REGION 6							
Missouri-Oahe Projects	29	5,693					
Missouri-Souris Projects	31	11,086					
Riverton Project	7	3,352					
Upper Missouri Projects	17	2,823					
Totals & Averages	84	22,954					
REGION 7							
Fryingpan-Arkansas Project	537	309,435	10		262	32.3	847
Kansas River Projects	40	10,113					
North Platte River Projects	11	4,648					
Totals & Averages	588	324,196	10		262	30.8	808

\*FATALITIES INCLUDED IN TOTAL DISABLING







**WHAT  
ABOUT**

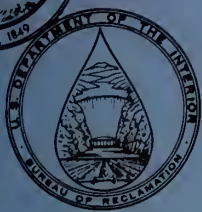
**DRUNK  
DRIVERS?**



**if they're sick, let's  
help them, but ---  
FIRST let's get them  
OFF the ROAD !**



SAR



# Reclamation

## SAFETY NEWS

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AT URBANA-CHAMPAIGN

SECOND QUARTER 1971





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Front Cover Photo: Power Operator Training Center. A new training center that simulates operating conditions at hydroelectric power generation and transmission facilities has been completed at the Bureau of Reclamation's Engineering and Research Center in Denver, Colorado. The training center is being used to provide refresher and advanced training for the Bureau's power operating personnel. The center is believed to be the most complete facility of its kind in the world. Two-week training sessions, the first of which began on April 12, 1971, will provide added experience for power operating personnel and improve their proficiency in coping with emergency conditions that may occur in power systems operated by the Bureau. The Bureau's extensive power system consists of 50 powerplants, 300 substations, and more than 16,000 miles of transmission lines. (Also see page 4.) Photo PX-D-67622.1 NA



Harold T. Nelson  
Regional Director  
Region 1  
Boise, Idaho  
(Photo P222-  
D-69587)

I am amazed and delighted by the growth of the health and safety program and its general acceptance within the Bureau of Reclamation. Safety has made great strides in improving man's work environment and in the motivation and teaching of employees to carry out their jobs in a safe way.

When Region 1's first formal safety program was initiated about 25 years ago, it was exclusively limited to construction operations. Since that time, its scope has been expanded to all projects and other Bureau activities - planning, design, construction, operation and maintenance, public safety, and Job and Youth Corps Conservation programs.

The impact of the safety program has spread far beyond our own and our contractors' operations. Its contribution to and success in Bureau affairs has been observed and recognized by others with the result that irrigation districts and other water user groups have adopted and incorporated applicable aspects of our program into their operations.

It is a source of real satisfaction to watch the Bureau's safety program grow in stature since its inauspicious birth to its now widely recognized position of leadership in applying safety "know-how" to all phases of Regional activities. In Region 1, we intend to continue emphasizing "safety" - the health and well-being of people - as our most important activity.

# BUREAU SAFETY PERFORMANCE

## 1971 CUMULATIVE ACCIDENT RECORD

January 1 - June 30, 1971

### A. GOVERNMENT FORCES

<u>Region</u>	<u>Injury index*</u>	<u>Frequency rate</u>	<u>Severity rate</u>	<u>Vehicle accident rate*</u>
Region 1	1.5	2.3	67	7.8
Region 2	1.0	2.4	41	4.4
Region 3	1.4	2.6	55	3.9
Region 4	3.2	3.6	90	1.7
Region 5	0.0	0.0	0	2.0
Region 6	0.0	0.0	0	3.1
Region 7	<u>0.9</u>	<u>3.4</u>	<u>25</u>	<u>2.5</u>
Totals to Date	0.6	1.8	35	3.7

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Totals 1970	11.2	1.8	620	2.6
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\*Injury index is equal to frequency rate times severity rate divided by 100.  
Vehicle accident rate is the number of accidents per million miles driven.

### B. CONTRACTOR FORCES

<u>Region</u>	<u>Injury index</u>	<u>Frequency rate</u>	<u>Severity rate</u>	<u>Fatal injuries</u>
Region 1	6.5	2.3	282	0
Region 2	6.9	10.3	67	0
Region 3	20.2	11.6	174	0
Region 4	1.9	3.1	61	0
Region 5	62.7	19.6	320	0
Region 6	73.2	15.0	488	0
Region 7	<u>74.6</u>	<u>18.7</u>	<u>399</u>	<u>0</u>
Totals to Date	23.2	8.9	261	0

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Totals 1970	137.7	8.3	1,659	1
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### C. RECLAMATION CIVILIAN CONSERVATION CENTERS

Frequency rate	0.8
Severity rate	10
Vehicle accident rate	33.7

## LOST TIME ACCIDENT ANALYSIS

Government Forces - 1971  
Second Quarter

Cumulative to Date:  
June 30, 1971

### A. ACCIDENT CLASSIFICATION

<u>Description</u>	<u>No.</u>	<u>Days lost</u>
Lifting	1	21
Vehicles	6	76
Struck by object	4	99
Slip or twist	2	24
Fall	<u>3</u>	<u>96</u>
Totals	16	316

### B. OPERATIONAL SUMMARY

<u>Operation</u>	<u>Man-hours</u>	<u>No. of accidents</u>	<u>Days lost</u>	<u>Frequency rate</u>	<u>Severity rate</u>
Administration, Clerical and Design	3, 823, 326	0	0	0.0	0
Construction	1, 379, 565	3	99	2.2	72
Investigation	883, 835	1	23	1.1	26
Power O&M	1, 945, 602	9	161	4.6	83
Irrigation O&M	<u>1, 002, 185</u>	<u>3</u>	<u>33</u>	<u>3.0</u>	<u>33</u>
Totals	9, 034, 513	16	316	1.8	35

\* \* \* \* \*

## RECLAMATION'S POWER SYSTEM SAFETY STANDARDS REVISED

The Bureau of Reclamation has published Power System Safety Standards, First Edition, May 1, 1971, which supersedes the Power System Safety Handbook.

Copies of the new standards may be obtained at a cost of \$1.05 each from the Bureau of Reclamation, Engineering and Research Center, Building 67, Denver Federal Center, Denver, Colorado 80225 - Attention: Code 922.

\* \* \* \* \*



WORLD'S MOST COMPLETE OPERATOR TRAINING  
SIMULATOR INSTALLED (See Cover item)



(Photo PX-D-67619 NA)

## FOOD AND DRUG ADMINISTRATION ADOPTS STANDARDS FOR IMPACT-RESISTANT GLASSES

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OCCUPATIONAL SAFETY & HEALTH REPORTER

The Federal Food and Drug Administration adopted standards requiring the use of impact resistant lenses in eyeglasses except in cases where the physician or optometrist finds that such lenses will not meet the requirements of the patient.

The physician has the option of ordering heat-treated glass lenses, plastic lenses, laminated glass lenses, or glass lenses made impact resistant by other methods. The effective date for the change-over to impact-resistant lenses is December 31, 1971.

Under the newly-adopted standards, all such lenses must be capable of withstanding an impact test in which a five-eighths inch steel ball weighing approximately 0.56 of an ounce is dropped from a height of 50 inches on the horizontal upper surface of the lens.

### Records Required

The new standards also require that all packages or shipping containers of impact-resistant lenses, other than impact-resistant glass lenses for prescription use, bear a code or mark that will permit future identification of any given production batch by the manufacturer.

The manufacturer of the lenses is required to keep and maintain for three years records of sale and distribution, and make such records available upon request by any representative of the Food and Drug Administration.

### Effective Date Explained

The Administration noted that the transition to impact-resistant lenses must start immediately and be completed as promptly as possible, but that to provide for the development of an adequate supply of impact-resistant lenses, the effective date of the new policy has been set at December 31, 1971.

FDA stressed, however, that after that date eyeglasses and sunglasses must be fitted with impact-resistant lenses, except when the physician or optometrist finds that impact-resistant lenses will not fulfill the visual requirements of a particular patient.

# SAFETY AWARDS

MIKE ROONEY  
RECEIVES  
MERITORIOUS  
SERVICE  
AWARD



Mr. Morris "Mike" Rooney--who recently retired from his position as Project Safety Officer, Grand Coulee Third Powerplant Construction Office, Grand Coulee, Washington--is shown as his wife, Vera, pins on the Department of Interior Meritorious Service Emblem. The coveted Meritorious Service Award was presented to Mr. Rooney for his outstanding achievements in the field of safety and accident prevention. The citation from Secretary of Interior Rogers B. Morton stated, "Mr. Rooney demonstrated outstanding abilities as a Safety Officer and Engineer with the Corps of Engineers and the Bureau of Reclamation." Commissioner of Reclamation Ellis L. Armstrong lauded Mr. Rooney for his "outstanding achievements in directing safety programs at the Yellowtail Project in Montana and the Grand Coulee Third Powerplant in Washington." The presentation was made by Construction Engineer J. R. Granger during a retirement party on May 21, 1971, given in Mr. Rooney's honor. (Photo P1222-D-69586)

DEPARTMENT OF THE INTERIOR  
CERTIFICATE OF SAFETY ACHIEVEMENT



Photo P245-713-4925 NA

Mr. G. D. Winans, Region 7's Regional Safety Engineer, is shown above (right) presenting a certificate of Safety Achievement to Project Manager James E. Stokes and Project Safety Officer Ted McCormick (center), for the achievement of the South Platte River Projects, Loveland, Colorado, in attaining 1, 570, 000 man-hours worked without a disabling injury during a period of over four years.

This presentation was made on May 14, 1971, just a short time before Mr. McCormick's retirement on June 1, 1971, after almost 30 years as a Government employee, the last 15 of which were with the Bureau of Reclamation. Since coming to Loveland from Norton, Kansas, six years ago, Ted McCormick has received several citations for his efforts in the safety field.

On his own time, "Mac" demonstrated the lifesaving breathing technique of mouth-to-mouth resuscitation to some 5, 000 persons. In three different years, he taught over 400 students each year in Loveland High School health classes. His interest in safety has extended to active participation in the Northern Colorado Water Safety Council, of which he is a past president.

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# FROM THE FIELD

## FRYINGPAN- ARKANSAS PROJECT



George Huber, Safety Director  
USAF Academy, (left) and  
C. R. Zimbelman, Conference  
Coordinator



James M. Ingles  
Regional Director

## SAFETY MANAGEMENT CONFERENCE

PUEBLO, COLO. Mar. 24-25, 1971



R. E. Evans  
Project Manager



Panel (1 to r) G. D. Winans,  
Regional Safety Engineer,  
George Kregger, Tom Traylor



H. S. Latham  
Chief, Safety Division



H. E. McInnis  
Construction Engineer



Harry Singh  
Project Mgr., Dravo Corp.



Fred Lippold  
E&R Center



Panel (l to r) John Brady, Safety Engineer,  
Robert Reinhardt, Raymond Kehler  
Andrew Bryce, Gayle Achterberg

The Bureau of Reclamation's Fryingpan-Arkansas Project sponsored a Safety Management Conference at the Pueblo Ramada Inn on March 24-25, 1971, attended by 120 employees of the Fryingpan-Arkansas Project.

Project Manager R. E. Evans opened the conference stating the purpose, scope and objectives. Speakers and participants included Mr. Ingles, the Regional Director, and representatives from the Regional Solicitors's Office, Engineering and Research Center, United States Air Force Academy, General Services Administration, Denver Water Board, Southern Colorado State College, IBM Corporation, and Dravo Corporation. At a banquet held the evening of March 23 for Reclamation employees and guests, Captain Clary, USAF Academy, gave a timely presentation on ecology.

Region 6 Regional Office, Billings, Montana--Compliance with Safety Regulations: At the Regional Monthly Safety Committee Meeting, the minutes of a foreman's tool-box safety meeting were reviewed. It was brought out that a Government visitor to the project violated five of their basic safety rules. The contractor recommended that all visitors be escorted on the job. Safety rules, Government or contractor, apply to all personnel coming on a construction job and must be adhered to. Government personnel entering a construction job should check in with the inspection forces and preferably be escorted over the job.

A construction inspector's safety activities report, which affords good coverage of pertinent points in stage construction, is quoted as follows: "The contractor's employees were reminded to maintain at least a 10-foot clearance from all energized lines, bus, and equipment. Taglines are to be used at all times while erecting

steel structures with a crane. One signalman is to give all the signals to the crane operator. The men were told to use tool bags while working in the air on steel structures and to belt off. No person shall be permitted to ride on hooks, loads or structural members being hoisted. While operating the crane, temporary grounds are to be used on the crane and connected to a ground mat. The contractor worked two days this week under a clearance, and before any work was performed the contractor's men were called together in the clearance area and the limits of the clearance were pointed out to all of the men."

Parker-Davis Project, Phoenix, Arizona--Radial Arm Saw Safety: Mr. Hubert S. Jerrell, Project Safety Officer, conducted a 3-hour training session on radial arm saw safety for 22 project employees who may have occasion to use the recently acquired radial arm saw.

Yuma Projects Office, Yuma, Arizona--Rollbars Protect Driver and Tractor: While working on the side of a mountain, approximately 80 feet above the floor of the canyon, a tractor operator was slowly backing when the left track hit a large rock. The machine rolled over on its side, but the rollbars protected the operator and also prevented the tractor from rolling off the ledge, as shown in the photograph below. There was no injury to the operator and only slight damage to the tractor. (Photo P35-D-69585)





Grand Coulee Dam Operations Office, Coulee Dam, Washington--  
Personal Protective Equipment: A machinist sustained a nondis-  
abling injury when a 130-pound weight fell on his right foot. The  
impact was sufficient to indent the steel toe of his safety boot  
(shown below) and injure his toes. According to the attending  
physician, the fact that he was wearing safety boots prevented a  
disabling injury, which could have resulted in a permanent dis-  
ability. (Photo P222-D-69588)



#### WARNING ON SPRAY-TYPE OVEN CLEANERS

Underwriters' Laboratories, Inc., reports that spray-type oven cleaners may, when sprayed on knobs or push operators of electrical controls or switches, cause short circuits or grounds, which can result in fires or eye damage due to arcing. The oven door light switch is especially vulnerable.

Spray-type cleaners can also cause a buildup of film on temperature-sensing bulbs located in the oven, causing inaccurate oven temperature insofar as the dial setting is concerned. Such bulbs should be wiped clean after each use of a cleaner, and care should be taken to prevent disturbing the position of the bulb.



## SAFETY REQUIREMENTS POINT WAY TO VERSATILE NON-ELECTRIC ROCK BLASTING METHODS USED AT GRAND COULEE'S THIRD POWERPLANT

--By Donald Duck, Field Engineer, Grand  
Coulee Third Powerplant Construction  
Office, Grand Coulee, Washington

The most extensive program of controlled blasting in the history of the Bureau of Reclamation can be termed highly successful as the excavation for the Third Powerplant at Grand Coulee Dam nears completion. The excavation job, consisting of 8,600,000 cubic yards of rock, had the twofold problem of providing for the safety of construction personnel and preserving the integrity of adjacent structures and generating equipment on existing Grand Coulee Dam, the nation's largest hydroelectric installation. Structures under construction at Grand Coulee Dam at present consist of the powerplant to house six generating units, which, when completed, will develop 3,600 mw of power, a concrete gravity forebay dam, high voltage cable tunnel, 500-kv cable spreading yard and switchyard.

Safety considerations dictated that the contract specifications provide for the protection of personnel and property from the premature detonation of explosives due to the extraneous electricity in the construction area. Adjacent powerplant, substations and critical electrical equipment required that all blasting be closely monitored and controlled to eliminate the possibility of structural damage from excessive blast vibrations.

The high level of intensity of extraneous electricity in the area made it necessary to prohibit the use of electric blasting of any type. To reduce the possibility of damaging vibrations, the total amount of explosives for each blast was determined on the basis of the distance from the blast site to adjacent structures. As a result, explosives used for a single shot varied from 5 pounds to over 60,000 pounds. Delay blasting techniques also were employed to reduce the vibrations transmitted to nearby structures. Use of delays added a "plus" since they minimized the danger from fly-rock and improved the rock fragmentation.

Because of the extraneous electricity in the area, it was necessary to utilize non-electric firing and delay systems for all blasting operations. This provision was incorporated in the contract specifications. Three systems of non-electric firing were employed by the contractors. One system was termed a surface delay system and consisted of a TNT cast primer, detonating cord, the explosive, and surface connectors (delays) of 5, 9, 17, and 25 milliseconds duration. This system was ignited by 4 feet of safety fuse and a single non-electric blasting cap. The surface system was used



General view of right abutment, right 230-kv switchyard,  
before beginning construction of the Third Powerplant.  
Photo P1222-142-391

when the amount of powder permitted to be detonated instantaneously equaled or exceeded the amount of powder in a single hole.

Also a system employing the use of "Primadet" delays was used for blasting the rock. "Primadets" are non-electric delays manufactured by the Ensign-Bickford Company, which are ignited by a very small diameter detonating cord similar to prima-cord. The delays are available in 20 different millisecond delay periods, varying from instantaneous detonation to 1 second delay. This system is particularly adaptable to deck loading or multiple deck loading when it becomes necessary to detonate each deck within each hole separately. The system consists of a section of safety fuse, a non-electric blasting cap, detonating cord, "Primadet" delays, a cartridge powder primer and the explosive. It should be noted that conventional nitroglycerin-based explosives cannot be used with the "Primadet" since the small detonating cord will



Removal of Block 91 of existing dam. Upstream cofferdam, consisting of steel cellular cells, can be seen in left center of photograph. Photo P1222-142-3645.

prematurely initiate this type of explosive. As a result, only powders of limited sensitivity are used with "Primadets."

The third system employed was a combination of the two systems described above. Surface connectors or delays were used in the detonating trunkline network, and downhole "Primadet" delays were used in the various decks within each hole. This system offered the maximum in versatility, and was particularly adaptable to conditions which permitted only small charges to be detonated by each delay, but which required relatively large quantities of explosive in the blast.

The complicated nature of the blasting program produced a wide variety in the size and nature of blasting techniques. Detailed planning preceded each blast, and information obtained from each blast was utilized in planning the next. The general excavation plan required the excavation for approximately 20,000 cy rock per day. To meet the excavation schedule, the contractor determined that a 40-foot bench cut, utilizing 5-inch diameter production holes drilled to a depth of 44 feet on 12-foot x 13-foot centers would probably be the most practicable. In some instances, 3-1/2-inch interspaced 20-foot-deep satellite holes were added to improve surface breakage. Production holes were primed in the



bottom with a 90 percent cast TNT primer, loaded with 50 to 80 pounds of TNT-sensitized water gel explosive (slurry) and 200 to 220 pounds of prilled ammonium nitrate and fuel oil mix. Wet holes required the use of slurry, gelatin and stick powder. Powder factors varied from .5 pound per cubic yard to 1.5 pounds per cubic yard and averaged approximately .9 pound per cubic yard. Larger blasts varied from 30,000 pounds of explosives to 60,000 pounds, decreasing in size as the dam and cofferdam were approached. The maximum amount of powder used per delay was approximately 3,000 pounds.

As the existing structures were approached, the size of each blast was reduced, and the amount of powder permitted in a single delay was determined on the basis of permissible ground vibrations. A typical controlled blast consisted of 40 holes containing 100 pounds of explosives each for a total of 2 tons of explosive. Since vibration control permitted only 25 pounds of powder per delay, the powder in each hole was placed in four separate 25 pound decks. The decks were separated by wet sand stemming and detonated by a combination of surface and downhole delays.

To preserve slope stability and prevent overbreak, both presplitting and smooth-wall-blasting techniques were used. In general, the presplitting method was used in sound rock and smooth-wall-blasting in fault zones and in unstable rock formations. Normally, 3-inch-diameter holes were drilled to a depth of 48 feet on 24- to 30-inch centers. The bottom of each hole was loaded with a 2- x 16-inch stick of 50 percent gelatin dynamite and the remainder of the hole loaded with 7/8- x 24-inch 70 percent semigelatin presplit powder. The preshearing powder factor varied from .1 pound per square foot to .15 pound per square foot. The presplit holes were fired prior to the production holes.

Smooth-wall blasting was accomplished using a double row of slope holes spaced on 3- to 5-foot centers with 4 feet between rows. The holes were loaded with low strength 1-1/4 x 8-inch 25 percent dynamite stick powder taped to detonating cord on 2.5- to 3.0-foot centers. The slope holes were delayed last and fired with the production holes.

A special blasting problem in connection with excavation for the forebay dam entailed the removal of approximately 240 lin. ft. of the right side of Grand Coulee Dam without damaging the main structure. Grand Coulee dam was originally constructed of a series of 50-foot x 50-foot x 5-foot-deep concrete blocks, which extended from bedrock to the crest of the dam. To accommodate the new third powerplant, five of these block sections, varying in

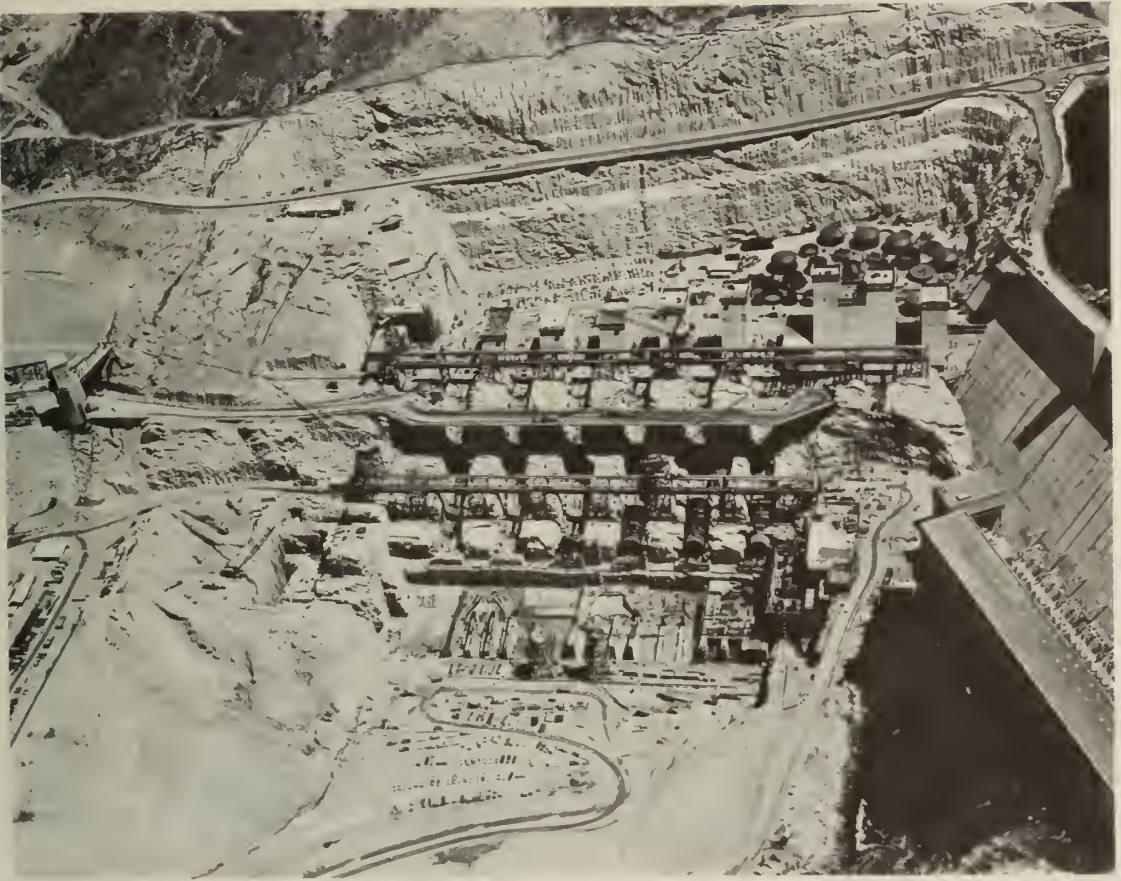




View of forebay dam excavation, upstream cofferdam and roadway. What appear to be benches on the rock backslope are blasting lift lines, each lift shot with 40-foot drilled holes. Photo P1222-142-4758

height from 40 feet to 160 feet, had to be removed without disturbing the remaining temporary cofferdam which was built to permit the removal of these block sections.

The first step in the removal operation was to blast out a 15-foot-wide section extending from the crest of the dam to bedrock between the main structure and the sections to be removed. The five concrete sections were then individually toppled over downstream into the excavated area by simply blasting away a wedge-shaped section of the foundation under each section. The largest single section removed contained 8,000 cubic yards of concrete and was removed by a single blast containing one ton of explosive. Since only 40 pounds of explosive per delay could be safely used, the shot contained 50 separate delays. Total period of the blast was approximately 900 milliseconds or 9/10 of a second.



View of forebay dam under construction, installation of 40-foot-diameter steel penstocks in penstock slots, and draft tube construction in the powerplant.  
Photo P1222-142-12857

Underwater excavation for a concrete anchor block located downstream of the Grand Coulee dam, which will eventually connect the existing right powerplant with the new third powerplant, presented another challenging blasting problem. In this operation, underwater blasting was necessary to excavate the foundation for the anchor block and a downstream cofferdam. In both instances, drilling was carried out in the "dry" by sloping holes from the exposed rock surfaces or by casing through backfill material. Considerations of time, economy and safety made it essential that the underwater blasting be done without a hitch. The consequences of failure would have resulted in reverting to a costly and time-consuming marine operation.

The anchor block foundation was of bench design, and controlled blasting methods were necessary to prevent damage to the excavated surfaces between bench levels. Proximity to the existing



right powerplant limited the amount of explosive to about 18 pounds per delay. Holes were decked on two levels with 9 pounds of explosive per deck. The upper deck of two holes was detonated with a single delay. The blast contained a total of 960 pounds of explosives and 53 different delay periods.

Structural vibrations were effectively controlled by a monitoring system which measured and recorded blast vibrations reaching the dam, the cofferdam, and the nearby powerplant and switchyard. Particle acceleration in two directions, horizontally and vertically, was measured and recorded by a system employing Statham Accelerometers, Brush Carrier Preamplifiers and Recorders. The magnitude of the acceleration after each blast could be determined visually from a chart, and from this chart the frequency of vibration could be determined.

In addition to eliminating the danger of premature explosions from stray currents, the non-electric blasting method provided additional safety since the electrical hazards commonly associated with blasting operations were eliminated. By use of surface delays or insertion of "Primadet" delays in the firing lines, an infinite series of delays were available, making the technique extremely versatile and adaptable to the control blasting required. The non-electric blasting technique used was comparable with conventional blasting operations when considering both time and expense.

One contractor's field superintendent summed it up when he stated, "Without the non-electric blasting system, the job would have been nearly impossible under the control conditions demanded by the nature of the operations."

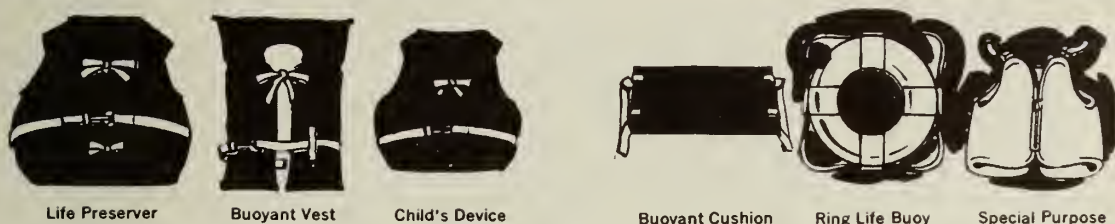
Considering the inherently hazardous nature of the excavation and other preparatory work associated with the initial construction of the Third Powerplant, Bureau contractors have compiled an exemplary safety record. From the beginning of construction in 1967 through June 1971, contractor employees have worked close to 5,000,000 man-hours with an accident frequency rate of 4.2 accidents per million man-hours. This achievement was made possible due to the emphasis placed on safety by the Bureau and its contractors in following the health and safety standards incorporated in the contract specifications.

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# WATER SAFETY

## GLOSSARY OF FLOTATION AIDS

--Reprinted from the Navy Department's  
"Safety Review" July 1971



(Photo P25-300-10918)

Lifesaving devices take several forms, and a choice must be made, on the basis of circumstances - the kind of activity, and the age and swimming ability of the wearer. The National Safety Council reports as follows:

Life Preservers. Life preservers have superior buoyancy. They hold the wearer upright so that the face of a nonswimmer or unconscious person is above the water. Preservers come in both jacket and bib designs. They should be Coast Guard approved (so marked on the label) and international orange in color.

Buoyant Vests. Vests closely resemble the bib-type preservers except that they have less buoyancy and do not hold the wearer quite as high out of the water. However, they do hold him face up. Those receiving Coast Guard approval may be of any color. Because vests are less bulky than preservers, they are favored for fishing and active pursuits.

Children's Devices. Children's preservers and vests are designed for persons weighing less than 90 pounds, and within that limitation have the same flotation capability as the adult devices. Adults should never try to get by with a child's preserver nor should children be equipped with the adult size except in an emergency. The adult preserver does not fit snugly enough on a child to prevent slipping out of it.

Buoyant Cushions. These serve the dual role of boat seat cushions and life-saving devices. Since you sit on them, they are handy in an emergency, and they are easy to throw to a person in distress. But they do not give positive protection to children, nonswimmers and injured persons because they must be clung to in the water. Grasp the straps, or put your arms through the straps and hug the cushion to your chest. Never wear the cushion on your back like a pack since it may turn your face under the water.



Cushions should bear Coast Guard approval. They receive rougher treatment than other lifesaving devices and wear out faster. Inspect for tears in the plastic envelope and broken straps.

Ring Life Buoys. All Coast Guard-approved ring buoys are fitted with a grab rope and may be colored either white or orange. Approximately 60 feet of line should be attached to the grab rope on the buoy with the other end fastened to the boat or dock. Mount the ring buoy on brackets where it will be readily accessible, and when throwing it, take care not to hit the person in the water.

Special Purpose Devices. Several buoyant devices are designed for special uses--water ski jump vests, ski belts, boat racing harnesses, hunter's vests and jackets--but none of them provide positive protection. Their lightweight construction allows greater freedom of movement than the bulkier life preserver. If you use one of the special purpose devices, you should be a good swimmer. And wear it only when participating in the recreation for which it was designed. A device that carries the Yacht Safety Bureau's seal of approval also has been approved by the Coast Guard.

Fishermen and hunters often prefer a cool and lightweight vest which can be inflated by a self-contained CO<sub>2</sub> cartridge. It doesn't interfere with actions such as casting, rowing or swinging a shotgun and doesn't tire the wearer. However, no inflatable lifesaving device has been approved by the Yacht Safety Bureau due to the danger of hidden puncture. An inflatable vest should be worn at all times while on the water, always with an approved buoyant device along as a backstop.

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## NATIONAL SAFETY COUNCIL DATA SHEETS

The National Safety Council has recently published new or revised technical data sheets on the subjects listed below. Copies of these data sheets (by the numbers shown in parentheses) may be obtained from the National Safety Council, 425 N. Michigan Avenue, Chicago, Illinois 60611:

Drinking Water on Construction Jobs (399, Revision A)  
Manlifts (401, Revision A)  
Pendant-operated and Radio-controlled Cranes (558, Revision A)  
Changing Out Railroad Car Wheels (242, Revision A)  
Falling or Sliding Rocks in Quarries (332, Revision A)  
Perchloric Acid (HClO<sub>4</sub>) (311, Revision A)  
Vertical Shoring of Concrete Formwork (628).

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## BIG SURF, ARIZONA'S OCEAN - SALT RIVER PROJECT



Cooling off is the name of the game; these youngsters are enjoying Big Surf's cool water during Arizona's hot summer. Big Surf, Arizona's ocean in the desert is a 20-acre lagoon, 9 feet at its deepest point, containing 4, 000, 000 gallons of recirculating treated water. Surrounding the lagoon is a 4-acre beach. The unusual feature of this recreation facility is the wave generation process capable of producing a 3- to 5-foot wave every 45 to 80 seconds. Salt River Project water marketed through the city of Tempe, provides the water for Big Surf facilities. The Salt River Project, authorized in 1903, was the Bureau of Reclamation's first large multipurpose water resources project. (Photo P25-300-10918)

# RECORD OF PUBLIC DROWNINGS

January 1, 1971, through June 30, 1971

## Bureau-operated Facilities:

Canals	19
Reservoirs	2
Total	<u>21</u>

## Facilities Operated by Others:

Irrigation and Water Districts	13
State or County (Recreational)	21
Total	<u>34</u>

## Summary of Total Drownings During Period:

By Operating Agency:	
Bureau of Reclamation	21
Irrigation and Water Districts	13
State or County (Recreational)	21
Total	<u>55</u>

By Type of Facility:	
Canals	31
Reservoirs	24
Total	<u>55</u>

By Activity:	
Swimming	13
Boating	8
Fishing	4
Fell into water	15
Other	15
Total	<u>55</u>

By Age:	
Under 12 years of age	8
From 12 to 25	26
From 25 to 50	12
Over 50 years of age	9
Total	<u>55</u>

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# VEHICLE SAFETY

## SAFER CARS ON THE WAY

In 1970 the National Highway Traffic Safety Administration awarded contracts to build four Experimental Safety Vehicles - at a cost of approximately \$1,946,875 per car. Each is destined for total destruction, but, as a result of this "crash" program, it is expected that by 1975 you can purchase a car which will:

1. Let you walk away from a head-on collision at 50 miles an hour.
2. Keep you alive after a roll-over at 70 miles per hour.
3. Let you absorb a side impact with minimal risk at 30 miles per hour.
4. Give you no repair bills for collisions up to 10 miles an hour.

After the Department of Transportation tests the safety cars, and destroys them in the process, it plans to let a contract to build 12 more cars at an estimated \$3 million. These are to be practical, stylized automobiles designed to keep the consumer from becoming another number in the highway fatality statistics. There were 55,300 recorded deaths due to automobiles last year.

The following changes are predicted to be made in the American automobile:

1. Hydraulic bumpers which will reduce the crash load of a car.
2. Improved braking and steering systems.
3. Better door systems to reduce side impacts.
4. A passive restraint system, such as an air bag which inflates in case of collision.
5. Improved, fireproof gas tanks.
6. Better rear vision systems provided by rooftop periscope.



7. Better emission control (the safety cars already meet the 1973 emission requirements).

### MEDICAL EXAMINATION FOR DRIVERS

The West German government has announced a proposal to introduce obligatory medical examination for all applicants for driver licenses. The examination would be given by a physician of the driver's choice who would then issue a certificate stating that the applicant is free from any physical or mental defects that might interfere with his ability to control a motor vehicle on the road.

### MIXING RADIAL AND CONVENTIONAL TIRES IS A SAFETY HAZARD!

After a driver was killed in an accident, the investigation revealed that the car had a radial tire on the right front wheel and conventional tires on the remaining three wheels. This condition was considered a significant accident cause factor. It was suspected that the radial tire held a true track, while the conventional tires lost traction and caused the skid that resulted in a head-on collision.

The mixing of radial and conventional tires is a safety hazard! Preferably, radial tires should be installed on all four wheels. However, if only two radial tires are installed, they should always be used on the rear wheels. Radials should never be installed on front wheels with conventional tires on the rear.

The basic design of radial tires is such that when you turn the steering wheel, they immediately take up the new tire heading without the normal side deflection of conventional tires. This would produce a skid in the case of conventional tires on the rear and radial tires on the front. The use of only one radial tire on the front is highly dangerous, even under ideal road conditions.

## REPRODUCED BY POPULAR DEMAND

### SAFE DRIVER AWARD PROGRAM

The National Safety Council Safe Driver Award is the recognized trademark of professional drivers who have proved their skill in avoiding traffic accidents.

The award plan is more than a means of rewarding drivers with good safety records. The rules spell out what is expected of drivers in the way of safety performance--the ability to operate a motor vehicle without having a preventable accident. The award rules constitute a yardstick by which drivers can measure their own performance and by which supervisors can measure the performance of individual drivers. When this standard of performance is clearly understood by both drivers and supervisors, it becomes a logical, fair, and workable basis for effective safety supervision.

#### DO YOU PLAY AN ACTIVE PART IN THIS PROGRAM?

Are you aware that every Bureau employee who holds a current Reclamation Operator's permit and drives a Government, contract, or privately owned vehicle on official business as part of his assignment a minimum of 100 working days in a twelve-consecutive-month period is eligible for an award?

THE CATCH OF COURSE IS DRIVING DURING THIS PERIOD  
"WITHOUT BEING INVOLVED IN A PREVENTABLE ACCIDENT."

Personnel who drive only during rush periods or on sporadic occasions are not eligible to participate in the program.

The program is administered by the respective Regions of the Bureau of Reclamation in accordance with Reclamation Instructions 350, Part 365.11.6 and the award rules and regulations set forth in the National Safety Council's manual entitled "Safe Driver Award Rules" (as amended by the Bureau of Reclamation). Form 7-1635, Driver's Yearly Report and Certification - Safe Driver Award, is required for all eligible drivers and is maintained by the individual's supervisor for submission at the appropriate time.

REMEMBER, winning a SAFE DRIVER AWARD also earns you a "PAT ON THE BACK" from management; you can be certain that your performance has not gone unnoticed. Your skill as a defensive driver is measured by your ability to recognize and control accident producing situations. It is an ability that is shared by all Safe Driver Award winners and one that you should use every mile of every trip.

### DEFENSIVE DRIVING CONTINUES ON IN REGION 3

As part of its efforts to "Zero in on Federal Safety," Region 3 is doing its part by continuing to require all of its employees holding a Government driver's permit to take the National Safety Council's Defensive Driving Course.

Shown below is a group of graduates who recently successfully completed the course in Region 3. From the left around the room: Willie Langston, Regional Office, Boulder City, Nevada; Bennie Sanchez, Regional Office; Tom Conroy, Boulder Canyon Project; Charles R. McMurtry, Mead Substation, Parker-Davis Project; Molinda Shaw, Boulder Canyon Project; Mildred Rhoades and Jim Boyles, Instructors; Ed Mayo, Regional Office; Wayne Christenson, Southern Nevada Water Project; Andrew Alvarez and Allen Moore, Regional Office; Joel Miller, Bureau of Fish and Wildlife, Las Vegas; Jim Collett, Henry Hamlin, Douglas V. Patrick, Ted Capps, and Donald W. Fisher, Boulder Canyon Project. (Photo PX-D-69589)



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May 11, 1971

## POWER MAINTENANCE INSTRUCTION NO. 25

United States  
Department of the Interior  
Bureau of Reclamation  
Engineering and Research Center  
Division of Power Operation and Maintenance

### Chlorine Gas System Precautions

A recent incident within the Bureau indicates the need for a program governing the moving, storage, and maintenance precautions to be used in connection with chlorine gas. This instruction sheet is intended to emphasize major points in working with this dangerous gas.

#### A. Moving Chlorine Gas Cylinders

1. Never move a chlorine container (cylinder) unless the cylinder valve hood is in place.
2. Do not drop a container or allow an object to strike the container with force.
3. Never apply heat to chlorine containers or their valves.
4. A hand truck having a clamp support at least two-thirds of the way up the cylinder should be used when moving cylinders.
5. When lifting a cylinder using a crane or hoist, a special cradle or carrier should be used. Never use a rope sling, chain or magnetic device.
6. Never lift a cylinder by means of the valve protection hood.

#### B. Storage of Chlorine Gas Cylinders

1. One extra full or empty container may be racked and stored in the chlorine room. All other containers should be stored

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Note: Power Maintenance Instruction sheets are sent to all recipients of Power O&M Bulletins and shall be retained as supplements to those bulletins.



outside of attended powerplants and pumping plants. The storage area should be dry and protected from all heat sources, including the sun.

2. Never store containers near turpentine, ether, anhydrous ammonia, finely divided metals, hydrocarbons, oxygen cylinders, acetylene cylinders, or any flammable materials.

3. The storage area should be clean, well vented to atmosphere, and remote from elevators, gangways, ventilating systems or any other areas that would disburse a leaking gas rapidly throughout the building.

4. Valve protectors should always be on during storage.

5. Cylinder should be stored in an upright position, not stacked, and free of other stored material.

#### C. Operation and Maintenance

1. Never tamper with the fusible plug safety devices on containers.

2. Never alter or repair the container or its valve; if damaged, the chlorine supplier should be advised.

3. Never place a container in a bath of hot water or apply direct heat to increase the flow rate or for any other reason.

4. A flexible connection should be used between the container and the piping system. Copper tubing suitable for 500 psig (3/8-inch OD x .035-inch wall) is recommended. Yokes (clamps) and adaptors are recommended for connection to the container valve outlet.

5. Never do maintenance work on the system unless the tank valve is closed.

6. When a container is empty, its valve should be closed, lines disconnected, and the valve tested for leaks. If ok, an outlet cap should be applied promptly and the valve protection hood attached. If the valve does not seat on first trial, open and close it lightly until proper seating is obtained. Never use a hammer or any other instrument to effect a tight valve closure.

7. To detect a leak, apply a cloth to the end of a stick, soak cloth with ammonia water, and hold close to suspected area. (Do not get the ammonia in direct contact with brass.) A

white cloud of ammonia chloride will result if there is a chlorine leak. (A commercial supply of 26° Baume ammonia water should always be available. Household ammonia is not strong enough.)

#### D. Precautionary Measures

1. Do not enter a chlorine contaminated area unless wearing self-contained breathing apparatus, which is on hand in all Bureau powerplants and pumping plants (RI 365.8.8).

Canister-type chlorine masks do not afford protection if chlorine concentrations exceed 1 percent and the oxygen concentration is below 16 percent.

2. Should a leak develop in the piping system, shut off the chlorine supply and dispose of system gas still under pressure prior to repairing the leak. Should a major leak develop either in the piping or in the cylinder which cannot be controlled, clear the area of personnel and exhaust the fumes to the outside.

3. In event of a cylinder valve leak, tighten the packing nut with a special wrench. Should the leak continue, replace the protective cap on the valve and remove the cylinder to the outside.

4. If the cylinder leaks, turn the cylinder at an angle which will permit gas instead of liquid to escape. This will minimize the amount of chlorine lost through the leak.

5. Do not use water on a chlorine leak.

6. In event of fire, cylinders should be removed from the fire zone immediately.

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Note: Consult your safety engineer for procedures to be followed in an emergency and the type of first aid treatment to be rendered to persons exposed to chlorine fumes.

\* \* \* \* \*

## CRANE HOOK TESTS AND INSPECTIONS

(Supplement to PO&M Bulletin No. 19,  
"Maintenance Schedules and Records," Section 5)

Failure of a crane hook can result in extensive damage to equipment and serious injury to personnel.

To assure the integrity of all Bureau crane hooks, the following program is recommended:

1. Discontinue the practice of painting crane hooks and remove the paint from existing hooks to facilitate visual inspection.
2. A visual inspection of each crane hook should be made prior to any heavy lifting and on a monthly basis.
3. Crane hooks should be measured annually and discarded if the throat measurement has increased 15 percent from the original dimension.
4. Incipient cracks are not always visible. Each hook should therefore be checked annually for cracks by being subjected to a Magnaflux, Zyglo, or some other suitable nondestructive crack detection test. If equipment for these tests is not available in the Region or from local test equipment rental sources, this office will aid in locating such equipment upon request.

\* \* \* \* \*

## POWER MOWERS NOT TOYS

The latest U.S. Public Health Service statistics show that each year mowers may cause more than 140,000 injuries requiring medical attention. The Outdoor Power Equipment Institute, in recognizing the problems of operating a power mower, has issued "A Guide for the Mowing Man (And His Family)" for distribution at power mower retailers. It's a good idea to post one where you store your lawn and garden equipment, and re-read it often. The address of the Outdoor Power Equipment Institute is 734 - 15th Street NW., Washington, D.C. 20005 - Mr. Harold Howe, Executive Secretary.

\* \* \* \* \*

## THE EFFECT OF DRUGS AND OTHER STRESSES ON SAFETY

(From a talk presented by Capt. C. A. Burkhart, MC, USN, Staff, COMSUBLANT, Norfolk, Va., at the Navy East Coast Regional Safety Conference)

### DRUGS

The spreading abuse of drugs is one of the major symptoms of an illness in our society today. While the detection and control of alcohol abuse on the job is relatively easy, we have a different problem with drug abuse. Drugs can be hidden, disguised, and ingested without the knowledge of even the most intimate associate. Hundreds of incidents have been uncovered involving personnel in the Fleet and shore establishment. It takes no imagination to visualize the danger this represents. Any use of depressant, stimulant, or hallucinogenic type of drug aboard ship or in a shipyard can constitute a hazard to the individual, his shipmates, fellow workers, or to the safety and operational readiness of the Fleet.

There is a type of drug user that we hear little about but who needs our attention--the well-intending individual receiving or taking drugs for disease or body dysfunction.

Drug usage in this country is almost universal and apparently increasing each year. There are pickup pills, nerve pills, pain pills, appetite pills, . . . sleeping pills, stay awake pills, and many other kinds of pills containing the same basic ingredients that thrill the user. The pills may be prescribed by a physician, purchased over the counter, or passed around by friends, relatives, and neighbors. Some of these drug-containing pills are of relatively low strength and create no real concern. However, many produce reactions affecting mental and physical performance such that a danger is created on the job. Common sense tells us that sedatives cause drowsiness; stimulants and appetite suppressants cause hyper-irritability and nervousness; narcotic analgesics create euphoria and apathy; and that while tranquilizers seem harmless with proper usage, withdrawal of the drug may be accompanied by agitation and anxiety.

Unfortunately, most people (including accident investigators and physicians) fail to consider the effect of other nonsedative, non-narcotic or nonstimulating drugs. Antihypertensive agents, muscle relaxants, antihistamines and anticholinergics are only a few of many drugs that may affect mental or physical stability. These drugs may act upon nerve endings, the vascular system, or the central nerve system. Faintness, dizziness, sleepiness, or abdominal upsets are only a few of the ways they may adversely



influence alertness and skills. These are undesirable and unintended "side effects;" a price that we must frequently pay in the treatment of disease. All known drug "side effects" are routinely published. Physicians warn and advise recipient patients of the possibility. The problem lies in predicting the occurrence of the undesirable effects. A drug may be used regularly with no apparent harmful effect. However, under certain combinations the drug happens to produce an adverse reaction--for example, antihistamines and analgesics and fatigue may potentiate many drugs. All too often the bad effects of combinations are discovered only when the individual realizes he cannot perform properly, or after an accident has occurred.

Everyone interested in accident prevention bears a responsibility in minimizing the hazard of drug use in unsafe environments. Workers and supervisors must be educated and reminded of potential hazards. Investigators should be suspicious of the possible drug-associated influence in accidents. Physicians should be aware of the demands of the occupation or activity when prescribing. He must evaluate potential effects upon the recipient and his environment. The industrial physician or shipboard medical officer must be alerted when any drug is recommended or prescribed that affects mental or physical prowess. Many Navy and Marine Corps personnel work in demanding environments in ships, aircraft, nuclear reactor compartments, magazines, and with firearms--just to mention a few. In addition, many work with sophisticated machinery and weaponry in these environments. Because of this, early detection has the highest priority--there is no room for a drug user in these critical areas! His use of drugs may not only be harmful to himself, but because of the very nature of his job, can endanger the lives of all members of his unit. One mistake can mean tragedy. Therefore, in some cases, it will be necessary to change the job or remove the individual from work for the duration of the drug effectiveness. (For example, air crews are grounded if any of a wide variety of drugs have or are being taken. Submarine personnel underway are relieved of their duties for 8 hours when any mind-affecting drug is taken.) Such accident prevention measures undoubtedly are indicated elsewhere. At the moment there is little control.

I do not suggest that all drug use is hazardous or detrimental to human efficiency. Some unrelieved symptoms may be worse than relieved symptoms. Pain is distractive and may lead to danger being unrecognized or may incapacitate the individual until relieved. Another example is diseased emotion such as a depressed or anxiety state. In these conditions the mental capacity to react as in a normally conditioned response is distorted, intelligent reaction yields to emotionally dominated reactions that are inappropriate in normal self-interest, and sleep patterns may be disrupted and

motivation altered. Often the emotion causes confusion or failure to comprehend danger. Efficiency and work output eventually suffer. Drugs might then be used to increase the efficiency of the individual. It must be remembered, however, that drugs may either increase or decrease conditioned reflexes inappropriately. If the individual works in an environment requiring rapid mental or physical response, the physician must carefully evaluate the potential effect. He, alone, can determine whether a drug or disease is compatible with work to be performed.

In addition to alcohol and drugs there are other human factors that we must learn more about if we are to achieve a maximally rewarding safety program.

### FATIGUE

Few of us have failed to observe or experience declining work efficiency and accidents with fatigue as a contributory factor. Fatigue is relatively intangible--there is no adequate way of measuring the phenomenon. Biochemical, physiological, psychological and social factors are so involved that fatigue is often unrelated to the amount of energy expended. Skill and attention demands beyond capacity, monotony, external emotional stresses, responsibility, and disease are but a few of the many factors involved. The only consistent characteristics are a decrease in output of work and a conscious sense of tiredness.

There are, however, practical limitations of worker endurance that have been observed. During World War I the British found production output significantly decreased if work hours exceeded 60 per week and that maximum hourly output was achieved at 8 hours per day, 6 days a week. Other studies have demonstrated sick absenteeism increased when a 50 hour workweek was exceeded. Accident rates increase as well if similar workweeks are imposed.

Sleeplessness or insufficient sleep must not be confused with fatigue, but may coexist to create a combined and more serious effect. Controlled studies have demonstrated memory lapses, irritability, inattention, hallucinations or illusions, and loss of equilibrium if sleeplessness is prolonged over 30 hours. Subtle changes accompanying an overwhelming desire to sleep may occur earlier in some individuals that adversely affect mental and physical performance, especially when mixed with other factors such as the aforementioned fatigue, following an all night drinking spree or hangover. I doubt that any data on field accidents attributed to sleeplessness is proportionate to real occurrence.

## CIRCADIAN RHYTHM

Sleep, work, and rest habits vary from person to person. Generally, the habits are characteristic in that they are associated with a rhythmic biological cycle quite beyond our control. Metabolism, hormone production, and mental functions have a succession of peaks and troughs. We are simply not in a constant state of physiological and psychological equilibrium. As if directly controlled by the body metabolic rate, human group studies have demonstrated 24-hour cyclic variations in skill, speed, accuracy and steadiness; maximal in late afternoon and minimal at night and early morning. When this schedule is disrupted several days may be required for adjustment. Until the adjustment is complete, behavior changes are likely to result, contributing to inefficiency and the increased likelihood of errors. This cyclic phenomenon is referred to as the "Circadian Rhythm." Flight crews, Government, and big business officials are alerted to this physiologic effect and are restricted from work or encouraged to rest for 72-96 hours after east-west jet air travel.

We have no statistical data relating disruption of the circadian rhythm produced by changing shift and watch schedules to performance or accident rates in the shipboard or shipyard environment; however, a direct relationship must be assumed. Supervisors should be alert to the effect and use basic measures to reduce the impact:

1. Advising increased caution during schedule changes;
2. Minimizing shift and watch rotations;
3. Allowing adequate time for rest; and
4. Providing extra supervision during schedule changes.

## NOISE

Although everyone is aware of the annoyance of noise, the influence of noise upon work efficiency and accidents is a subject rarely discussed. Noise is generally tolerated as a necessary element of environmental discomfort. However, noise is known to cause mental irritability and "nervous strain;" reduce efficiency and accuracy; and have a distracting effect upon mental tasks and the capacity for alertness, especially when the noise is loud and intermittent in nature. With all the tin knocking, chipping and hammering in the Navy, it would be amazing if a significant contribution to accidents is not being effected. In a telephone exchange wrong numbers were observed to decrease 42 percent when the background noise was reduced from 50 to 35 decibels. The effect



of background noise at this low level suggests a certain contribution to human error where environmental noise ranging over 100 db is commonplace. Human error, more often than not, is cause for accidents.

## GENERAL

Although the subjects I have covered thus far bear no apparent resemblance, they have a common characteristic--they are all sources of human stress causing man to perform in such a manner as to produce less and increase his accident liability. There are other factors that could be discussed at length--internal stresses of disease and worry, or external stresses such as temperature extremes and poor illumination. The important thing to remember is that man is subject to many stresses that minimize or distract him from a healthy fear of danger or cause him to work less efficiently. Yet, except for alcohol (and, more recently, drugs) these human factors are rarely reported as associates to accidents, even though the magnitude of this influence is impressive. A DuPont study revealed 59 percent of accidents were due to personal failure alone; only 7 percent could be attributed to causes not under the control of the worker.

Take a look at the vectors of stress affecting man and his ability to perform efficiently and safely. Often these factors coexist. When this happens, the effect on the man's liability is more likely to be multiplied rather than additive. Here, I think, the term "accident proneness" may be correctly applied. As long as these stresses are applied, singly or in multiples, the interaction sets up the potentials of repeated accidents. Hence, an "accident repeater" is more likely to be found and the truth is that these factors make us all more accident-prone at varying times and to varying extents. This is not shifting all the blame to the individual, rather it is an appreciation that accidents to a large extent are the result of man being unable to cope with some stresses and danger simultaneously. If we are to reduce this susceptibility to accidents we must be aware of and begin to evaluate these factors more carefully. From deeper evaluation I am confident we will find the stimulus and guidance for a different approach to accident prevention.

Look now at the trend of work accident rates. Notice the leveling trend of late. Does this mean that we have reached a level we must accept, or does it mean that another downward trend awaits the application of new ideas? I prefer to believe the latter. I believe that we need to know more about the interaction of man, his stresses, and his work. In order to do this we must amplify investigations; delve more deeply into the human factor prior to the accident; and update our reporting practices accordingly. It



may be also that, with multiple human factors, retrospective analyses of accidents are insufficient and that longitudinal or prospective analyses of selective variables will be necessary to make the desired breakthrough.

Whatever it may be, man's part in the contribution to accident rates need not be accepted as a fixed quantity. To this end we need to know what makes him unsafe. I have presented an overview of several types of stresses that are known to make man unsafe. We have long been aware of alcohol and drug factors in the human element of accidents. Only recently have we begun to develop a moderate degree of detection and prevention of the two liabilities. The degree of involvement of these and other factors is still a mystery. If you wisely accept the philosophy that man is part to 90 percent of all accidents, whether the result is machinery or human loss, you can understand my plea for improved methods of accident investigation and research. With more knowledge in this direction we can focus our attention on modifying his work, his environment, or possibly man himself.

\* \* \* \* \*

#### WHAT OTHERS ARE SAYING

C. L. Gould, publisher, San Francisco Examiner, speaking before the National Association of Real Estate Boards:

" . . . Make no mistake about it, the environmental problems that confront our nation and the world are of major magnitude. But--they are not insurmountable. They can and will be solved.

"However, they will not be solved through protest marches and confrontations.

"They will be solved by harnessing the best brains of science, chemistry, physics and engineering and then providing sufficient funds to cover the essential research and proper implementation . . . ."

\* \* \* \* \*

# SAFETY PERFORMANCE RECORD

## CUMULATIVE QUARTERLY REPORT

### GOVERNMENT FORCES

2nd QUARTER, 1971

PERIOD FROM JANUARY 1, 1971 THROUGH June 30, 1971

REPORTING OFFICE	NUMBER OF EMPLOYEES	MAN HOURS	DISABLING INJURIES		DAYS LOST	FREQUENCY RATE	SEVERITY RATE
		CUMULATIVE THIS YEAR	CUMULATIVE THIS YEAR	FATAL #	CUMULATIVE THIS YEAR	CUMULATIVE THIS YEAR	CUMULATIVE THIS YEAR
Washington Office	267	281,232					
Denver Office	1,218	1,262,208					
REGION 1							
Boise Regional Office	187	172,111					
Central Snake Project	39	37,302	1		26	26.8	697
Chief Joseph Dam	25	26,585					
Columbia Basin Project	243	249,160					
Grand Coulee Dam Operations Office	321	322,769					
Green Springs Powerplant	2	2,102					
Hungry Horse Project	44	38,304					
Lower Columbia Development Office	39	39,477					
Lower Teton Project Office	13	7,092					
Minidoka Project	68	71,430	1		8	14.0	112
Snake River Development Office	42	44,235					
Third Powerplant Construction Office	246	213,659	1		53	4.7	248
Tualatin Project	13	10,127					
Upper Columbia Development Office	36	36,652					
Yakima Project	30	26,771					
Totals & Averages	1,348	1,297,776	3		87	2.3	67
REGION 2							
Sacramento Regional Office	477	577,533					
Regional Drill Crew	23	23,832	1		23	42.0	965
Auburn-Folsom South Unit	223	233,486					
Cachuma Operations Field Branch	3	2,854					
Central Coast Dev. Field Branch	4	3,840					
Folsom Field Division	74	80,384					
Fresno Field Division	134	141,568	1		5	7.1	35
Fresno CVP Construction Office	125	129,596					
Klamath Project Office	16	16,291					
Lahontan Basin Projects Office	20	22,336					
Sacramento Valley CVP Constr. Office	75	91,368					
San Luis Unit CVP Construction Office	47	47,010					
Shasta Field Division	139	143,687	1		21	7.0	146
Solano Operations Field Branch	2	2,016					
Tracy Field Division	156	168,548	1		20	5.9	119
Totals & Averages	1,518	1,684,359	4		69	2.4	41
REGION 3							
Boulder City Regional Office	199	180,480					
Boulder Canyon Project	158	151,613					
Dixie Project Office		4,212					
Lower Colorado River Project	160	170,608	1		44	5.9	258
Parker-Davis Project	335	346,317	2		20	5.8	58
Phoenix Development Office	94	94,720					
Southern California Dev. Office	20	17,100					
Southern Nevada Water Project	47	70,477					
Yuma Projects Office	122	127,680					
Totals & Averages	1,135	1,163,207	3		64	2.6	55
REGION 4							
Salt Lake City Regional Office	205	205,628					
Central Utah Project	190	184,207					
Grand Junction Projects Office	107	111,103					
CRSP Power Operations	271	258,263	3		74	11.6	287
Durango Projects Office	31	29,146					
Logan Development Office	5	5,160					
Lyman Project	9	13,244					
Upper Green River Projects Office	18	18,850					
Totals & Averages	836	825,611	3		74	3.6	90
REGION 5							
Amarillo Regional Office	100	98,037					
Albuquerque Development Office	32	32,045					
Austin Development Office	38	40,800					
Loan Program Projects Office	1	1,032					
Middle Rio Grande Project	216	239,697					
Mountain Park Project	26	5,888					
Navajo Project	84	78,043					
Oklahoma City Development Office	17	17,322					
Pecos River Office	20	19,764					
Rio Grande Project	197	188,955					
San Juan-Chama Project	30	41,252					
Totals & Averages	761	762,835					
</							

\*FATALITIES INCLUDED IN TOTAL DISABLING

GPO 201-555

## DEPARTMENT OF THE INTERIOR BUREAU OF RECLAMATION

## SAFETY PERFORMANCE RECORD

CUMULATIVE QUARTERLY REPORT  
GOVERNMENT FORCES

2nd QUARTER, 1971--

PERIOD FROM JANUARY 1, 1971\_\_ THROUGH\_\_\_\_ June 30, 1971

[illegible]

# SAFETY PERFORMANCE RECORD

## CUMULATIVE QUARTERLY REPORT

### CONTRACTOR FORCES

2nd QUARTER, 1971

PERIOD FROM JANUARY 1, 1971 THROUGH June 30, 1971

REPORTING OFFICE	NUMBER OF EMPLOYEES	MAN HOURS	DISABLING INJURIES		DAYS LOST	FREQUENCY RATE	SEVERITY RATE
		CUMULATIVE THIS YEAR	CUMULATIVE THIS YEAR	FATAL #	CUMULATIVE THIS YEAR	CUMULATIVE THIS YEAR	CUMULATIVE THIS YEAR
REGION 1							
Columbia Basin Project	39	66,776	1		60	15.0	899
Grand Coulee Dam Operations	20	1,168					
Hunery Horse Project	3	643					
Third Powerplant Construction Office	1,558	1,236,416	2		309	1.6	250
Yakima Project	6	4,940					
Totals & Averages	1,626	1,309,943	3		369	2.3	282
REGION 2							
Sacramento Regional Office		25,333					
Auburn-Folsom South Unit	516	219,401	4		26	18.2	118
Fresno CVP Construction Office	187	74,511					
Fresno Field Division		2,339					
Klamath Projects Office		180					
Sacramento Valley CVP Const. Office	26	21,716					
San Luis Unit CVP Construction Office	72	41,181					
Tracy Field Division		4,114					
Totals & Averages	801	388,777	4		26	10.3	67
REGION 3							
Lower Colorado River Project	12	5,309					
Parker-Davis Project	1	52					
Phoenix Development Office	14	4,544					
Southern Nevada Water Project	73	224,574	3		45	13.4	200
Yuma Projects Office		24,726					
Totals & Averages	100	259,205	3		45	11.6	174
REGION 4							
Salt Lake City Regional Office	2	4,248					
Central Utah Project	170	255,470					
CSPR Power Operations		720					
Grand Junction Projects Office	64	45,985	1		20	21.7	435
Lysman Project	8	12,372					
Upper Green River Projects Office	10	8,195					
Totals & Averages	254	326,990	1		20	3.1	61
REGION 5							
Navajo Indian Irrigation Project	175	119,852	3		49	25.0	409
Pecos River Office	16	10,683					
San Juan-Chama Project	10	22,516					
Totals & Averages	201	153,051	3		49	19.6	320
REGION 6							
Missouri-Oahe Projects	57	17,330					
Missouri-Souris Projects	217	98,269	2		65	20.4	661
Riverton Project		5,103					
Upper Missouri Projects	22	12,520					
Totals & Averages	296	133,222	2		65	15.0	488
REGION 7							
Fryingpan-Arkansas Project	535	656,819	13		277	19.8	422
Kansas River Projects	49	23,651					
North Platte River Projects	17	12,189					
South Platte River Projects	6	752					
Totals & Averages	607	693,411	13		277	18.7	399

\* FATALITIES INCLUDED IN TOTAL DISABLING









7-805



# Reclamation SAFETY NEWS

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UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF RECLAMATION  
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Front Cover Photo: Commonwealth Electric Company and Dominion Construction Company were presented the Bureau of Reclamation's Construction Safety Award for the exemplary safety record achieved in completing two contracts covering the construction of 242 miles of the Fort Thompson-Grand Island 345-kv Transmission Line. Mr. B. P. Bellport, Director of Design and Construction (left) and Mr. A. Hugh Whitmore, Construction Engineer, Huron, South Dakota (right) are shown presenting the Construction Safety Award to Mr. Paul C. Schorr III, Executive Vice-President, Dominion Construction Company. (Photo PX-D-68644)

## THE PRESIDENT

### EXECUTIVE ORDER 11612

#### Occupational Safety and Health Programs for Federal Employees

The Occupational Safety and Health Act of 1970, 84 Stat. 1590, authorizes the development and enforcement of standards to assure safe and healthful working conditions for employees in the private sector. Section 19 of that Act makes each Federal agency head responsible for establishing and maintaining an effective and comprehensive occupational safety and health program which is consistent with the standards promulgated by the Secretary of Labor for businesses affecting interstate commerce.

Section 7902 of Title 5, United States Code, authorizes the President to establish by Executive Order a safety council composed of representatives of Federal agencies and of labor organizations representing employees to serve as an advisory body to the Secretary of Labor in carrying out a Federal safety program.

As the Nation's largest employer, the Federal Government has a special obligation to set an example for safe and healthful employment. It is appropriate that the Federal Government strengthen its efforts to assure safe and healthful working conditions for its own employees.

NOW, THEREFORE, by virtue of the authority vested in me by section 7902 of Title 5 of the United States Code, and as President of the United States, it is hereby ordered as follows:

#### ESTABLISHMENT OF OCCUPATIONAL SAFETY AND HEALTH PROGRAMS IN FEDERAL DEPARTMENTS AND AGENCIES

SECTION 1. The head of each Federal department and agency shall establish an occupational safety and health program (hereinafter referred to as a safety program) in compliance with the requirements of section 7902 of Title 5 of the United States Code and section 19(a) of the Occupational Safety and Health Act of 1970 (which Act shall hereinafter be referred to as the Safety Act). The programs shall be consistent with the standards prescribed by section 6 of the Safety Act. In providing safety programs for Federal employees, the head of each Federal department and agency shall—

(1) Designate or appoint a qualified official who shall be responsible for the management of the safety program within his agency.

(2) Establish (A) a safety policy; (B) an organization and a set of procedures, providing for appropriate consultation with employees, that will permit that policy to be implemented effectively; (C) a safety management information system; (D) goals and objectives for reducing and eliminating employee injuries and occupational illnesses; (E) periodic inspections of workplaces to ensure compliance with standards; (F) plans and procedures for evaluating the program's effectiveness; and (G) priorities with respect to the factors which cause occupational injury and illness so that appropriate countermeasures can be developed.

(3) Correct conditions that do not meet safety and health standards.

(4) Submit to the Secretary of Labor by April 1 of each year a report containing (A) the status of his agency's safety program in reducing

## THE PRESIDENT

injuries and occupational illnesses to personnel during the preceding calendar year as related to the goals and objectives established for that year; (B) goals and objectives for the current year; (C) a plan for achieving those goals and objectives; (D) any report required under section 7902 (e) (2) of Title 5 of the United States Code; and (E) such other information as may be requested by the Secretary.

(5) Cooperate with and assist the Secretary of Labor in the performance of the Secretary's duties under section 7902 of Title 5 of the United States Code and section 19 of the Safety Act.

### DUTIES OF THE SECRETARY OF LABOR

SEC. 2. (a) The Secretary of Labor (hereinafter referred to as the Secretary), or his designee in the Department of Labor, shall—

(1) By regulation, provide guidance to the heads of Federal departments and agencies to assist them in fulfilling their occupational safety and health responsibilities;

(2) evaluate the safety programs of Federal departments and agencies annually, and, with the consent of the head of the affected department or agency, the Secretary may conduct at headquarters or in the field such investigations as he deems necessary;

(3) develop a safety management information system to accommodate the data requirements of the program;

(4) submit to the President by June 1 of each year an analysis of the information submitted to him by the heads of the Federal departments and agencies. This analysis shall include the Secretary's evaluation of each agency's safety program and shall contain his recommendations for improving safety programs throughout the Federal service.

(b) By agreement, the Secretary may, to the extent permitted by law, extend the safety program provided for under this Order to Federal employees not covered under section 7902 of Title 5 of the United States Code and the Safety Act.

### FEDERAL SAFETY ADVISORY COUNCIL

SEC. 3. (a) A Federal Advisory Council on Occupational Safety and Health shall be established to advise the Secretary in carrying out his responsibilities under this Order. This Council shall consist of 15 members appointed by the Secretary and shall include representatives of Federal departments and agencies, and of labor organizations representing employees. At least three members shall be representatives of such labor organizations. The members shall serve for three year terms, except that, for the first Council, one third will serve for one year and one third for two years.

(b) The Secretary, or his designee, shall serve as the Chairman of the Council, and shall prescribe such rules for the conduct of its business as he deems necessary and appropriate.

(c) The Council shall meet at the call of its Chairman. It may establish such subcommittees as it finds necessary.

(d) The Council may establish or continue field affiliates in such manner and to the extent it deems advisable to support the purposes of this Order.

## THE PRESIDENT

### ADMINISTRATIVE AND BUDGETARY ARRANGEMENTS

SEC. 4. The Secretary shall make available necessary office space and furnish the Council necessary equipment, supplies, and staff services.

### EFFECT ON OTHER POWERS AND DUTIES

SEC. 5. Nothing in this Order shall be construed to impair or alter the powers and duties of the Secretary or the heads of other Federal departments and agencies pursuant to section 7902 of Title 5 of the United States Code, section 19 of the Safety Act, or any other provision of law.

### TERMINATION OF EXISTING ORDER

SEC. 6. Executive Order No. 10990 of February 2, 1962, is hereby superseded.

A handwritten signature in dark ink, reading "Richard Nixon", is positioned to the right of the date and location text.

THE WHITE HOUSE,  
July 26, 1971.

[FR Doc.71-10865 Filed 7-27-71;9:03 am]



# BUREAU SAFETY PERFORMANCE

## 1971 CUMULATIVE ACCIDENT RECORD

January 1 - September 30, 1971

### A. GOVERNMENT FORCES

<u>Region</u>	<u>Injury index*</u>	<u>Frequency rate</u>	<u>Severity rate</u>	<u>Vehicle accident rate*</u>
Region 1	1.0	1.5	69	7.9
Region 2	0.4	1.6	28	3.4
Region 3	2.0	3.5	58	4.6
Region 4	2.2	3.2	68	2.6
Region 5	0.03	0.9	3	1.8
Region 6	0.0	0.0	0	2.3
Region 7	<u>0.4</u>	<u>2.2</u>	<u>16</u>	<u>3.5</u>
Totals to Date	0.5	1.6	33	3.6
<hr/>				
Totals 1970	11.2	1.8	620	2.6

\*Injury index is equal to frequency rate times severity rate divided by 100.  
Vehicle accident rate is the number of accidents per million miles driven.

### B. CONTRACTOR FORCES

<u>Region</u>	<u>Injury index</u>	<u>Frequency rate</u>	<u>Severity rate</u>	<u>Fatal injuries</u>
Region 1	3.4	1.9	181	0
Region 2	2.5	6.2	40	0
Region 3	16.5	10.5	157	0
Region 4	0.9	2.2	43	0
Region 5	200.1	35.6	562	0
Region 6	17.4	7.3	238	0
Region 7	<u>49.3</u>	<u>16.5</u>	<u>299</u>	<u>0</u>
Totals to Date	15.5	7.9	196	0
<hr/>				
Totals 1970	137.7	8.3	1,659	1

### C. RECLAMATION CIVILIAN CONSERVATION CENTERS

Frequency rate 0.8  
Severity rate 11  
Vehicle accident rate 33.8

## LOST TIME ACCIDENT ANALYSIS

Government Forces - 1971  
Third Quarter

Cumulative to Date:  
September 30, 1971

### A. ACCIDENT CLASSIFICATION

<u>Description</u>	<u>No.</u>	<u>Days lost</u>
Striking against	1	4
Struck by object	5	108
Lifting	2	76
Vehicles	5	68
Slip or twist	3	42
Falls	5	135
Electrical shock	<u>1</u>	<u>12</u>
Totals	22	445

### B. OPERATIONAL SUMMARY

<u>Operation</u>	<u>Man-hours</u>	<u>No. of accidents</u>	<u>Days lost</u>	<u>Frequency rate</u>	<u>Severity rate</u>
Administration, Clerical and Design	5, 744, 900	1	31	0. 2	5
Construction	2, 073, 788	5	116	2. 4	56
Investigation	1, 305, 015	1	23	0. 8	18
Power O&M	2, 920, 951	11	191	3. 8	65
Irrigation O&M	<u>1, 508, 081</u>	<u>4</u>	<u>84</u>	<u>2. 7</u>	<u>56</u>
Totals	13, 552, 735	22	445	1. 6	33

\* \* \* \* \*

## 1969 WORK-INJURY EXPERIENCE IN CONSTRUCTION

The Bureau of Labor Statistics, U.S. Department of Labor, has issued its report on injury rates, by industry, for 1969. Contract construction's frequency rate (number of disabling injuries per million man-hours worked) increased from 26.9 injuries in 1968 to 28.0 injuries per million employee-hours in 1969. The severity rate (number of days lost per million man-hours worked) increased from 1,992 in 1968 to 2,154 in 1969.

Contractors performing work under contract with the Bureau of Reclamation experienced frequency rates of 11.4 and 8.3 during 1969 and 1970, respectively.

\* \* \* \* \*

# SAFETY AWARDS

## CONSTRUCTION SAFETY AWARD

BUREAU AWARD PRESENTED  
TO W. W. CLYDE CONSTRUCTION COMPANY



Above, left to right, are Messrs. Norman D. Clyde and Cornell Clyde of W. W. Clyde Construction Company accepting the Bureau of Reclamation's Construction Safety Award from Region 4 Director, David L. Crandall, and Project Construction Engineer, Maurice C. Wren for an exemplary safety record during construction of Meeks Cabin Dam and Access Road, Lyman Project, Wyoming. Contractor employees completed construction on the earth-filled dam on June 25, 1971, accumulating 438,312 man-hours of exposure without a single lost time injury. This is the third Bureau award presented to this Company for outstanding safety performance on large construction projects. (Photo X-400-997)

## MORRISON-KNUDSON COMPANY

### EARNs CONSTRUCTION SAFETY AWARD

Morrison-Knudsen Company, Inc., was recently presented Reclamation's Construction Safety Award in recognition of the exemplary accident record achieved while completing a contract on the Southern Nevada Water Project. Contractor personnel worked 2 years and 4 months--the entire contract period--without experiencing a single disabling injury.



Shown above is Mr. G. A. Samson, Construction Engineer, Southern Nevada Water Project, Henderson, Nevada, making the presentation to Mr. Dennis F. Dufenhorst, Project Manager for Morrison-Knudsen Company, Inc. (Photo P952-D-70116)



## SAFE DRIVER AWARDS

Personnel of the Regional Office, Region 3, Boulder City, Nevada continue to earn safe driver awards. The following personnel, participants in the National Safety Council's Safe Driver Award Program, totaling 130 years of safe driving, were recently presented their Safe Driver Award Certificate by Regional Director E. A. Lundberg.



Top row, left to right: Curtis M. Groom, 14 years; Grover Edmondson, 10 years; Walter J. Nicks, 15 years; George Graupensperger, 6 years. Middle row: Jack Pong, 2 years; Richard A. Groesbeck, 2 years; Howard H. Carver, 11 years; Eugene E. Hertzog, 13 years. Front row: Bobby R. Bond, 8 years; Leonard Stubbs, 6 years; and last but not least, Marion Everhart, 24 years. (Photo P45-D-70117)

Not shown are James Murchison, 14 years, and Iva Gaza, 5 years.

\* \* \* \* \*

## FROM THE FIELD

Lower Colorado River Project--Group scene of project employees who recently successfully completed the Bureau of Mines First Aid Course in Blythe, California.

Kneeling, left to right: R. S. Oram, Civil Engineer; Mrs. Mildred Rhoades, First Aid Instructor, Regional Office; John Cougill, Bureau of Mines, San Bernardino, California; Richard Reese, Surveying Technician. Standing, are: Raymond Sparks, Surveying Aid; Michael Langdoc, Surveying Aid; Robert Hribar, Contractor; Fred Haskins, Contractor; Louis Hlavay, Mechanic; Stanley Foster, Supervisory Civil Engineering Technician; Richard Benson, Foreman II, General Operator; John Ballard, Greaser; Robert Smith, Foreman II, Leverman; John Eddy, Construction Inspector; Willis Wade, Operator; and Mitchell Harmon, Operator. (Photo P423-306-7668 I)



Montrose Construction Field Division, Montrose, Colorado - Eye Protection: The Montrose Construction Field Division of the Grand Junction Projects Office reports that compliance with the eye protection program has been much improved during the past months. Several factors have brought this about. Foremost has been the meetings held by the Construction Engineer with crews to reaffirm the policy of this project. Each employee has been personally fitted, glasses adjusted, and elastic bands provided to hold glasses in place. There has been no record of eye injury at this office for over 4 years.

Colorado River Front Work and Levee System, Arizona-California - Protective netting: View looking southwesterly at the protective netting installed just above the outlet gates of Palo Verde Diversion Dam on the Lower Colorado River. This netting was installed to protect people from going through the discharge gates, and has saved at least two people from going over the gates on two different occasions. (Photo P423-300-11208 NA)



\* \* \* \* \*



## ENGINEERS AS HEROES

--By Robert L. Byrne, Editor, "Western Construction"  
Reprinted from "Western Construction" July 1971  
with permission of Mr. Byrne

I suppose it's not surprising that in the United States, the most technologically developed nation in the world, technologists are held in the lowest esteem. When a country is young and struggling to modernize, then the engineers and builders take on the status of national heroes. A hundred years ago Robert Louis Stevenson had this to say after watching a railroad construction project in the West: "If it be romance, if it be contrast, if it be heroism we require, what was Troy to this?"

There are many examples of the engineer as hero in our national literature, though nothing lately. Who could write about an engineer today as Willa Cather did in her 1912 novel *Alexander's Bridge*? Here's an extract, as given in Samuel Florman's *Engineering and the Liberal Arts* (McGraw-Hill, 1968), which has many such curiosities:

"Alexander stood six feet and more, glowing with strength and cordiality and rugged, blond good looks. There were other bridge builders in the world, certainly, but (he) looked as a tamer of rivers ought to look. Under his tumbled sandy hair his head seemed as hard and powerful as a catapult, and his shoulders looked strong enough in themselves to support a span of any one of his ten great bridges, that cut the air above as many rivers."

Florman also reminds us that Goethe's *Faust*, after risking his soul in traffic with the devil, finds fulfillment in the wisdom of his old age by working on a dike-building job, and that what the main character in Kafka's *The Castle* is trying so desperately to become is a land surveyor.

Today, of course, it is fashionable to cast constructors as villains. Today writers enjoy blaming engineers and "the engineering mentality" for many of this country's difficulties. The only contemporary writer I can think of who doesn't seem to be hostile to engineers is James Michener. In *The Source*, his novel about the history of the Jews, there is a wonderful section called the Song of the Hoopoe Bird, the story of a man who builds a tunnel vital to his village's existence.

Of course, it is set in 936 B.C., long before the Corps of Engineers became a threat to the environment.



What has happened? Why are engineers now the bad guys? The main reason, it seems to me, is that we are no longer a developing nation, in the physical sense. The need for great dams and railroads and power plants has been pushed aside in urgency by other problems, and engineering agencies, societies, and universities haven't been nimble or aware enough to keep up with the changes. Because of the plague of automobiles that afflicts us, the building of more roads seems wrongheaded; because of dwindling wilderness areas and threatened wildlife, more dams can be viewed as a crime against nature.

The problem for constructors and engineers is to somehow convince the public that while engineers were once needed to conquer the environment, they are now needed to save it. To clean up our lakes and rivers, to provide decent housing for our whole population, to find economical ways to recycle our resources, to put utilities and even transportation systems underground, these things can only be done by engineers.

This country needs engineers as heroes again, but engineers willing to become involved in social and political issues, engineers more concerned about injustice than inefficiency, more sensitive to people than things.

The rules of the game are changing fast . . . and so must the players.

\* \* \* \* \*

## BE AWARE OF FURNITURE HAZARDS

Remember that in an office you work surrounded by office furniture which cannot hurt you if you use it as it was meant to be used.

- Don't open more than one file drawer at a time. If you open more than one of the top drawers, it may tip over on you unless it is secured.
- Check desks and other furniture occasionally for sharp edges or splinters--they could cause injury, torn clothing, or snagged hose.
- Never leave desk or file drawers open. They could cause painful bumps and bruises to you or someone else.
- Where are your pencil sharpeners located? They can be a hazard if they protrude beyond desks, tables, etc., where people can bump into them.

\* \* \* \* \*

## WHAT IS A SAFETY OFFICER?

--Reprinted courtesy of FOCUS, Journal of  
the National Safety Management Society

Someone once said that "somewhere between the apple-cheeked innocence of the new office boy and the urbane worldliness of the board chairman, we find a delightful creature known as a 'safety director'." The author went on to imply that "goggle salesmen love them, litterbugs hate them, wives tolerate them, supervisors frustrate them, engineers ignore them, and the claims adjuster protects them." The safety director is characterized as "sentiment with statistics on its tongue . . . experience with scars on its hands . . . imagination with a clipping service . . . and faith with its fingers crossed."

A safety director today is none of these--if he is a part of the progressive movement to recognize that accident prevention responsibilities are shared by line and staff management; that the control of losses must be an integral part of total operations; that the safety management function is principally a catalyst, a coordinator, bringing to light problem areas for effective decision-making.

The safety officer is not responsible for accident prevention. If that's in your job sheet correct it. You as a safety officer are no more responsible for safety than you are for successful product research and development. If you were, you'd be a project or laboratory director. When errors are made, when condition defects result in accidental injury, machinery down-time, loss of program funds, then he should be concerned.

The safety officer should be a specialist, but not in the sense that most people think. He cannot be a qualified engineer, chemist, biologist, electrician, psychologist, contractor, management analyst, etc. Such a "jack-of-all-trades" would command a fantastic salary in today's age of specialization! The organization employs experts in these various fields, and the safety officer should know them, be able to speak their language, and work closely with them. The safety officer should be a generalist who can integrate pertinent knowledge into a cohesive whole. He must be able to collate the vast body of available knowledge into a set of practical, manageable, and usable guidelines and principles, and then apply them appropriately in safety management situations. This is the function of a manager, a safety manager.

If your desk drawer is crammed with 17 red pencils, 2 slide rules, a first-aid kit, a swatch of bumper stickers, 11 safety posters, 14 decals, 5 rolls of reflector tape, and a pocket calculator--watch out! When you become your boss's conscience, his shadow, alter ego, psychiatrist, and his despair--take stock! The safety management profession is a worthy one. It requires managers--professionals in their own right. Ours is a challenge of mutual cooperation toward a common goal; successful completion of the assigned mission through efficient and effective operation.

\* \* \* \* \*

REMARKS BY DON YOUNG  
ATTORNEY, REGIONAL SOLICITOR'S OFFICE  
DENVER, COLORADO  
AT THE  
FRYINGPAN-ARKANSAS PROJECT  
SAFETY MANAGEMENT CONFERENCE  
MARCH 24, 1971

"WHEN DO WE INCUR LIABILITY?"

When do we incur liability? The we here, of course, refers to the United States Government. And the simple answer is that the United States incurs liability whenever an officer, agent, or employee of the United States acting within the scope of his employment by his negligent act or by his negligent failure to act, with some exceptions, causes death, or personal injury, or damage to property under circumstances where an individual so acting or failing to act would be liable for such death, injury, or damage. This liability came with the adoption by the Congress in 1947 of what is called the Federal Torts Claims Act. A tort - in an oversimplified definition - is a wrongful act for which a civil action for damages will lie. A tort is a legal wrong; generally, it involves a legal duty, a breach of that duty and resulting damages. The word stems from a latin root with such derivatives as torquere, tortus, and tortum, from which we get such words as injustice, and twist, and bend, and that somehow adds up to wrong.

By this Act, the Congress withdrew, in certain situations, the protection of sovereign immunity. And what is sovereign immunity? This arose in the English common law and stems from the independence of the King - he was sovereign - he was chief - supreme - he owed allegiance to no one. There wasn't a question of the King being unable to do wrong - it was simply that no court could have jurisdiction over him. Jurisdiction implies superiority of power - no other was superior to the King. Here the people are sovereign. The people are the Government - nothing superior to the Government. We (the Government) now pay for most of the injuries we (the Government employee) cause. Exceptions which involve your activities - when we don't pay claims - would be those arising out of carrying out a statutory direction, a regulation, or a discretionary function, and the Government is not charged with liability for claims arising out of assault and battery, libel, slander, interference with contract rights. Otherwise the situations pretty much run the gamut of tort liability experiences: motor vehicle accidents, insecticide spray damage, faulty fire protection, inadequate equipment to perform a task - scuba diver drowned - improper flight instruction, improper storm warnings, unsafe working conditions, unguarded powerlines, falling trees - diseased tree in campground. I could go on almost endlessly to relate claims' situations within human experience. This is the scope of our liability.



And what our liability is in a given situation is governed by local law not Federal law. If a negligent act or omission - a particular tort - is actionable in Colorado - if it doesn't come within the Federal Act exceptions - we would have liability.

And what relationship does all of this have to safety and safety programs?

But first what is safety. Is it an emotion, is it a reaction, is it a result? It might be an avoidance; it might be an evasion. Its intent in our sphere of activity must be to eliminate an unnecessary and wasteful loss of resources - manpower, property, time. What is safety - don't we say "accomplishment with conservation"?

However safety is to be defined - I translate it into care - and lack of due care with resulting injury is negligence and that then spells liability. This responsibility for safety, for care, for lack of negligence, in our conduct of our employment endeavors, probably gets its greatest exposure in the Bureau's construction activities. Glamour gets its attention, but negligent injuries lack any discrimination in job classification. Whatever your job - it has some relationship to a possibility for tort liability. Safety, due care, is everybody's business - whatever you do.

Let's get a few general for instances. Management can enforce careful working habits - whatever the requirement no one has a constitutional right to be careless. If you can't train - you can ground. You have a responsibility to avoid tort liability - poor operators, improper personal habits; you may be responsible for putting an incompetent employee in a position to do harm.

I read somewhere that it is common knowledge that people are careless. It should be common sense to continue to do something about it. Our carelessness can cost the Government money. This is waste.

With this opportunity of being present here today, I will impose upon you further. We, in my office, give administrative consideration to all tort claims within our jurisdictional area, whether the determination is within our jurisdictional amount or for recommendation to the Department's Solicitor or even beyond to the Department of Justice. We are in the midst. Here we become the devil's advocate. We need to know the other's case. Ours is not a win or lose situation. It isn't a complete adversary situation. Our consideration is based on the administrative record. We can't defend or support a position if we don't know what has happened. What I am pointing at is accident investigations. Every incident with third parties requires investigation. I'm a pessimist - the Government now is fair game. Every incident represents a potential claim. The statute of limitations on filing a claim is two years.



It would be most difficult if two years hence we have no report, no evidence, no memory, only a claim. The report should be immediate and factual - who, what, when, where, how. No opinion, no explanation, but details. Extrapolations and interpretations are for the experts. Photos, sketches, witnesses' names - extra immediate paper work may save in the future. This is part of your responsibility. It's a part of making safety - due care - a part of your business.

Please be careful!

\* \* \* \* \*

## PREVENTION OF FALLS ON CONSTRUCTION PROJECTS

--Reprinted from National Safety Council's  
Construction Safety Release No. 99

The National Safety Council's 1969 edition of Accident Facts shows that 20.4 percent of all compensable work injuries are caused by falls, indicating that falls prevention requires top management attention.

An effective falls prevention program on a construction project is a requirement of the same importance as the type of concrete, structural steel, mechanical equipment and other components of the completed project. An effective program should include, but not be limited to, the following:

- a. Specifications should provide that all ramps, runways, platforms and ladders be fabricated and used in accordance with specific codes or standards (American National Standards, local state codes, or other applicable guidelines).
- b. All floor and roof openings into which persons can accidentally fall should be covered with material of sufficient strength to support loads which may be imposed upon them or surrounded by rigid barricades and toeboards.
- c. Wall openings with a drop of four feet or more from one side to the other should have landings and stairs or be guarded by a rigid barrier. The barrier is required even when the opening is equipped with a door.
- d. Safe access is required to all work areas. Incline ramps should have a non-skid surface. Rigid guard rails and intermediate rails should be provided for elevated walkways, stairways and wall openings. If permanent stairs cannot be installed to each floor with construction, then temporary stairs should be installed with the structure.

- e. Width, strength and slope of wood ladders are specified. They are secured at bottom and top. The side rails should extend at least 36 inches above the top landing. Top and bottom landing areas should be level providing firm footing and should be kept free of any material constituting a tripping or falling hazard.
- f. Wood ladders should be coated with a clear preservative, depending upon the exposure. Ladders should not be painted as painting wood ladders may conceal defects.
- g. Workmen on unguarded platforms, floors, or scaffolds more than 20 feet above ground, flooring, or water should be protected with safety nets. Plans for installing and the hardware for mounting nets should be reviewed prior to use in the same manner as other shop drawings.
- h. Tools and materials should never be carried while using ladders. If the tools or material cannot be carried in loops or pouches, or if they interfere in anyway with negotiating the ladder, they should be transported by handlines or other means.
- i. Workmen moved to or from elevated work areas should be hoisted by approved workmen's hoist, installed and used in accordance with A.10.4 ANSI Code.
- j. Each workman using a suspended scaffold should have a safety line suspended independent of the scaffold support. Workmen should have a safety belt and lanyard attached to the safety line.
- k. Work platforms should extend from the face of the structure to the guardrail and intermediate rail at the back of the scaffold.
- l. Construction ladders and stairs should have slip resistant steps and enough open tread to permit drainage of fluids and mud and be well illuminated from top to bottom.
- m. Work platforms, passageways, landings, stairs, and ladders must be kept clear of debris, tools, ice and snow, hoses and welding leads. Material stored on scaffolds and elevated work surfaces should be placed to allow for a clear work area and passageway.
- n. Metal scaffolding should be thoroughly inspected frequently. The strength of rusted scaffolding is unknown. (See ANSI, Safety Requirements for Scaffolding, A.10.8, 1969.)

While falls from an elevation are the type most frequently mentioned, falls on the same level are even more frequent and often equally serious. The following hazard controls are essential:

- a. Paths, roads or walkways should be maintained clear of obstructions.
- b. Material should be stored in an orderly manner to eliminate tripping hazards.
- c. Welding leads, hoses, extension cords and similar equipment should be placed so that they will not constitute tripping hazards.
- d. Continuous good housekeeping keeps all unused material, scrap and debris from accumulating in the work area.

Supervisors must make frequent, thorough surveys of the work area and have all deficiencies corrected immediately. They must insist on proper construction and maintenance of work surfaces and accessways.

By Luther U. Fleming, U.S. Army  
SAFEGUARD System Command,  
Huntsville, Alabama

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#### ISIA SNOWMOBILE SAFETY HANDBOOK AVAILABLE

For a detailed handbook of snowmobile safety tips write the International Snowmobile Industry Association, 5100 Edina Industrial Blvd., Minneapolis, Minnesota 55435. This price of this booklet of 8¢ each plus postage in quantity, however, a single complimentary copy may be furnished without charge.

\* \* \* \* \*

The average repair costs to a car after colliding with a deer in Colorado for 1970 was \$290. These reported accidents increased 45 percent in the last 5 years. If you are driving through deer country just after sunset, slow down and concentrate on deer detection and safe driving.

\* \* \* \* \*

## CONTRACTORS EXPAND SAFETY PROGRAM, REPORT GREAT SAVING IN LIVES, MONEY

--Copyrighted 1971 by the Bureau of National Affairs, Inc,  
Reprinted by special permission from the June 10 issue of  
OCCUPATIONAL SAFETY & HEALTH REPORTER

Significant reductions in accident rates and compensation payments are reported to be the result of an intensified safety effort begun in 1967 by the Seattle Northwest Chapter of the Associated General Contractors of America, Safety Director R. Charles Short told OSHR.

For the first time in 20 years AGC members received a reduction in State Workmen's Compensation payments, Short said, and no increase in insurance premiums has been made in three years.

The expanded AGC safety program took many phases. A monthly safety bulletin, detailing specific safety problems of contractors in western Washington, is sent to superintendents and foremen. A safety training course for superintendents and foremen was developed with 20 hours of classroom instruction. Nine such courses have been conducted so far with a total attendance of over 440.

A special training course in first aid is conducted by the Bureau of Mines to meet the needs of the building construction industry. Assistance is provided to all contractors in construction site safety inspections. Some contractors are assigning safety responsibility to different workers on the job to encourage participation.

The Associated General Contractors claim approximately 10,000 members nationwide with 112 in the Seattle Northwest Chapter.

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### "TRAINING THE TRAINERS" IN CONSTRUCTION SAFETY

Hundreds of construction personnel -- from crane operators to company presidents -- are learning the techniques of construction job safety under a speed-up instruction program of "training the trainers," developed under the Labor Department to improve implementation of the Occupational Safety and Health Act.

The program offers a free 40-hour course to concerned individuals and organizations, according to an article in the current Safety Standards, the magazine of the Occupational Safety and Health Administration (OSHA). The courses were begun in January of 1971 under the Construction Safety Act, and have been expanded this year as a result of the enactment of the Williams-Steiger Occupational Safety and Health Act of 1970.



The program operates on the "multiplier principle" of training initial groups to train others, says George C. Guenther, Assistant Secretary of Labor for Occupational Safety and Health administration. Guenther adds that "this is one of the most efficient ways to use our financial resources. It activates a maximum number of people."

The course is directed primarily toward the training of instructors who will in turn train first-line construction supervisors. The future instructors learn how to present both a 30-hour and a 10-hour course on construction safety and health for supervisors and middle managers. Those completing the course are provided with instructor manuals and color slides covering pre-job safety planning, job site fire prevention, demolition, weather hazards, electrical and chemical safety, and explanations of relevant Federal laws.

The stress is on actual job situations and the recognition of hazards, rather than on academic training, as such.

Classes originally were scheduled to be conducted in 25 cities, but demand has been so great that they have been extended to 35, and class size expanded from 25 to 35.

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## THE OTHER GUY

Many drivers will argue that their accident was nonpreventable because "the officer investigating the case ticketed the other driver"--but this argument does not hold up! Responsibility to prevent or avoid accidents goes beyond carefully observing traffic rules and regulations.

A professional driver always drives in such a manner that he can avoid all accidents regardless of the other driver's actions. No matter what the "other guy" did, an accident is preventable unless the professional driver did everything he reasonably could have done to prevent it.

In other words, a driver's weakest alibi is--"It was the other guy's fault."

\* \* \* \* \*

## ARE EAR PROTECTORS A NUISANCE?

--By E. L. Alpaugh, Chairman, Chemical Section  
Health Committee, National Safety Council

If a person were fortunate enough to inherit or be given a Stradivari violin, he would not knowingly throw it around or handle it carelessly. Yet this same person may subject his hearing to a terrific beating every day, not realizing that the ears are infinitely more valuable instruments than the finest violin ever made. Perhaps if he understood what complex and intriguing organs the ears are, he might be persuaded to protect them.

People often resist wearing ear protective devices in noisy areas unless the intensity of the noise approaches the painful level. When it is impossible to use engineering controls to reduce noise, or when a period of time will be required to install engineering controls, the safety professional must convince people that the use of plugs or muffs is in their own best interest.

Unfortunately, most individuals do not realize what an absolutely fantastic device they have in their heads: The mechanism that enables them to hear and communicate. Even if they had several hundred million dollars and the services of the best scientists in the world, they could not begin to reproduce such a wondrous instrument.

For example, the electronic gadgetry that has been developed for the exploration of the moon is simplicity itself when compared with the physical and electronic means by which the ear takes complex sounds of speech, somehow breaks them down into pure tones, changes the pure tones into impulses that travel through nerves and, finally, through chemical and electrical processes in the brain, and integrates everything into the understanding of speech.

If only people realized this, they would batter down the door to the safety department and demand that they be allowed to wear ear protection devices.

The human ear responds to rapid minute variations in ordinary atmospheric pressure, variations that lie within a frequency range of 16 Hertz (cycles per second) to 20,000 Hz. The ear is so sensitive that pressure fluctuations considerably less than one-millionth of the normal atmospheric pressure of 14.7 pounds-per-square inch can be detected. This very small unit of pressure is what we measure with a noise survey meter, and it is expressed as dynes per square centimeter ( $\text{dynes/cm}^2$ ). A young person with good hearing, under quiet conditions, can detect a sound pressure of  $0.0002 \text{ dynes/cm}^2$ . This is the pressure level of hearing against which all other hearing levels

are compared. In fact, the decibel, the unit we use for measuring sound, does nothing more than compare the pressure of another sound with this barely perceptible sound pressure. So, if we measure a noise level at 70 decibels, all we are saying is that it is 70 decibels more intense than the reference pressure level, which a person with good hearing can just detect.

In addition to being able to detect a pressure as low as  $0.0002$  dyne/cm<sup>2</sup>, the ear is sensitive through a range of pressures exceeding 2000 dynes/cm<sup>2</sup>. Thus, the higher pressure is 10 million times that which is first audible, a tremendous variation. Although the range of pressure is very large, by using decibels we are able to compress the range into something manageable, from 1 to 140 decibels. Thus, decibels are necessary if we are going to simplify measuring the range of pressures to which the ear is sensitive.

The ear not only is a marvel of electronic circuitry, but the mechanical method by which the outer and middle ear convert air pressure to liquid pressure within the inner ear is a thing of beauty. The eardrum, for example, is so finely tuned, that at very small pressure variations its movement or amplitude of vibration is less than the size of a hydrogen atom. Quoting from the book "Industrial Deafness" by Joseph Sataloff, M.D.: "It is fortunate that the ear is no more sensitive than it is, for if there were any greater degree of sensitivity, we might be forced to listen constantly to the vibrations of the molecules in the air around us."

High sound pressures do not have a detrimental effect on the ear drum or on the mechanical linkage of the so-called hammer, anvil, and stirrup bones in the middle ear, unless the sound pressure is very intense and very abrupt. Repeated intense sound can cause trouble deep within the inner ear in the sensitive organ that contains many thousands of hair cells. Depending upon the intensity of the noise, the duration of exposure, the frequency, and how often and how long noise is interrupted by periods of quiet and individual susceptibility, the hair cells become less responsive and eventually die. When this occurs, there is noise-induced hearing loss.

Other interesting facts about the ear are that it does have some built-in protection to continuous noise, especially in the low frequencies, and that it also has critical dampening. The built-in protection is a muscular device that limits the movements of the bones in the middle ear from moving excessively in response to pressure variations on the eardrum. The muscles involved, however, do not react swiftly enough to offer protection against sudden noise. The critical dampening prevents us from having an echo or resonating effect when we hear a sound. In other words, the nerve endings in the inner ear hear the sound one time only and do not resonate a second time. In addition, there is little or no loss of energy in the transfer of airborne sound



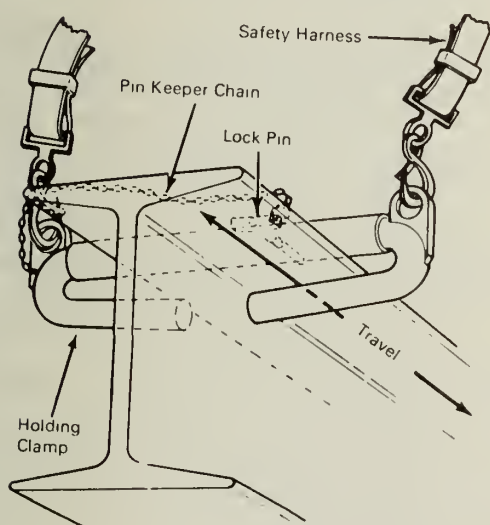
waves to the ear drum, through the ossicular chain of bones in the middle ear and then into the fluid of the inner ear. This in itself is a remarkable achievement.

Personal Hi-Fi Set. So, the next time someone tells you that ear plugs or ear muffs are a nuisance, tell him he is the fortunate owner of a personal "Hi-Fi" set that money cannot buy and that the most skillful surgeons in the world cannot replace. When you own something that fabulous, treat it as the divine gift it is. If that doesn't reach him, tell him it also is a nuisance not to hear what the good looking doll said to you at that noisy cocktail party. You never know what you may be missing with those tin ears of yours.

(NSC ED. NOTE: Mr. Alpaugh submitted this article as Chairman of the Health Committee, chemical section, NSC but feels credit for its preparation should be given to the entire committee.)

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## SAFETY YOKE PROTECTS CONSTRUCTION WORKERS



Construction workers handling tools and materials while high in the air astride steel girders are constantly in danger of falling. Currently, a harness is worn which completely encircles the beam on which they are working. This is a cumbersome and time consuming safety precaution, because it severely limits the worker's freedom of movement.

A new device permits the harness to slide freely along the girder. This is accomplished, as illustrated, by attaching the harness to a simple dismountable yoke that engages the upper flat of the

"I" beam. A locking pin secures the inner and outer sections of the yoke and locks it securely to beams with flanges from 8 to 14 inches wide.

Source: O. H. Goforth of Trans World Airlines, Inc. under contract to Kennedy Space Center (KSC-10075)

No further documentation is available.

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# SCAFFOLDING SAFETY RULES

as Recommended by

## SCAFFOLDING AND SHORING INSTITUTE

(SEE SEPARATE SHORING SAFETY RULES)

Following are some common sense rules designed to promote safety in the use of steel scaffolding. These rules are illustrative and suggestive only, and are intended to deal only with some of the many practices and conditions encountered in the use of scaffolding. The rules do not purport to be all-inclusive or to supplant or replace other additional safety and precautionary measures to cover usual or unusual conditions. They are not intended to conflict with, or supersede, any state or local statute or regulation; reference to such specific provisions should be made by the user. (See Rule II.)

- I. **POST THESE SCAFFOLDING SAFETY RULES** in a conspicuous place and be sure that all persons who erect, dismantle or use scaffolding are aware of them.
- II. **FOLLOW ALL STATE, LOCAL AND GOVERNMENT CODES, ORDINANCES AND REGULATIONS** pertaining to scaffolding.
- III. **INSPECT ALL EQUIPMENT BEFORE USING**—Never use any equipment that is damaged.
- IV. **KEEP ALL EQUIPMENT IN GOOD REPAIR.** Avoid using rusted equipment—the strength of rusted equipment is not known.
- V. **INSPECT ERECTED SCAFFOLDS REGULARLY** to be sure that they are maintained in safe condition.
- VI. **CONSULT YOUR SCAFFOLDING SUPPLIER WHEN IN DOUBT**—scaffolding is his business, **NEVER TAKE CHANCES.**

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| <p>A. <b>PROVIDE ADEQUATE SILLS</b> for scaffold posts and use base plates.</p> <p>B. <b>USE ADJUSTING SCREWS</b> instead of blocking to adjust to uneven grade conditions.</p> <p>C. <b>PLUMB AND LEVEL ALL SCAFFOLDS</b> as the erection proceeds. Do not force braces to fit—level the scaffold until proper fit can be made easily.</p> <p>D. <b>FASTEN ALL BRACES SECURELY.</b></p> <p>E. <b>DO NOT CLIMB CROSS BRACES.</b></p> <p>F. <b>ON WALL SCAFFOLDS PLACE AND MAINTAIN ANCHORS</b> securely between structure and scaffold at least every 30' of length and 25' of height.</p> <p>G. <b>WHEN SCAFFOLDS ARE TO BE PARTIALLY OR FULLY ENCLOSED</b>, specific precautions must be taken to assure frequency and adequacy of ties attaching the scaffolding to the building due to increased load conditions resulting from effects of wind and weather. The scaffolding components to which the ties are attached must also be checked for additional loads.</p> <p>H. <b>FREE STANDING SCAFFOLD TOWERS MUST BE RESTRAINED FROM TIPPING</b> by guying or other means.</p> <p>I. <b>EQUIP ALL PLANKED OR STAGED AREAS</b> with proper guard rails, and add toeboards when required.</p> <p>J. <b>POWER LINES NEAR SCAFFOLDS</b> are dangerous—use caution and consult the power service company for advice.</p> <p>K. <b>DO NOT USE ladders or makeshift devices</b> on top of scaffolds to increase the height.</p> <p>L. <b>DO NOT OVERLOAD SCAFFOLDS.</b></p> <p>M. <b>PLANKING:</b></p> <ol style="list-style-type: none"><li>1. Use only lumber that is properly inspected and graded as scaffold plank.</li><li>2. Planking shall have at least 12" of overlap and extend 6" beyond center of support, or be cleated at both ends to prevent sliding off supports.</li><li>3. Do not allow unsupported ends of plank to extend an unsafe distance beyond supports.</li><li>4. Secure plank to scaffold when necessary.</li></ol> | <p>N. <b>FOR ROLLING SCAFFOLD THE FOLLOWING ADDITIONAL RULES APPLY:</b></p> <ol style="list-style-type: none"><li>1. <b>DO NOT RIDE ROLLING SCAFFOLDS.</b></li><li>2. <b>REMOVE ALL MATERIAL AND EQUIPMENT</b> from platform before moving scaffold.</li><li>3. <b>CASTER BRAKES MUST BE APPLIED</b> at all times when scaffolds are not being moved.</li><li>4. <b>CASTERS WITH PLAIN STEMS</b> shall be attached to the panel or adjustment screw by pins or other suitable means.</li><li>5. <b>DO NOT ATTEMPT TO MOVE A ROLLING SCAFFOLD WITHOUT SUFFICIENT HELP</b>—watch out for holes in floor and overhead obstructions.</li><li>6. <b>DO NOT EXTEND ADJUSTING SCREWS ON ROLLING SCAFFOLDS MORE THAN 12".</b></li><li>7. <b>USE HORIZONTAL DIAGONAL BRACING</b> near the bottom and at 20' intervals measured from the rolling surface.</li><li>8. <b>DO NOT USE BRACKETS ON ROLLING SCAFFOLDS</b> without consideration of overturning effect.</li><li>9. <b>THE WORKING PLATFORM HEIGHT OF A ROLLING SCAFFOLD</b> must not exceed four times the smallest base dimension unless guyed or otherwise stabilized.</li></ol> <p>O. For "PUTLOGS" and "TRUSSES" the following additional rules apply:</p> <ol style="list-style-type: none"><li>1. <b>DO NOT CANTILEVER OR EXTEND PUTLOGS/TRUSSES</b> as side brackets without thorough consideration for loads to be applied.</li><li>2. <b>PUTLOGS/TRUSSES SHOULD EXTEND AT LEAST 6"</b> beyond point of support.</li><li>3. <b>PLACE PROPER BRACING BETWEEN PUTLOGS/TRUSSES</b> when the span of putlog/truss is more than 12'.</li></ol> <p>P. <b>ALL BRACKETS</b> shall be seated correctly with side brackets parallel to the frames and end brackets at 90 degrees to the frames. Brackets shall not be bent or twisted from normal position.</p> <p>Q. <b>ALL SCAFFOLDING ACCESSORIES</b> shall be used and installed in accordance with the manufacturers recommended procedure. Accessories shall not be altered in the field.</p> |
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# **STEEL FRAME SHORING SAFETY RULES**

*As Recommended by*

## **SCAFFOLDING AND SHORING INSTITUTE**

*(See Separate Scaffolding Safety Rules and Recommended Steel Frame Shoring Erection Procedure)*

Following are some common sense rules designed to promote safety in the use of steel frame shoring equipment. These rules are illustrative, and are intended to deal only with some of the many practices and conditions encountered in the use of steel frame shoring. The rules do not purport to be all-inclusive or to supplant or replace other additional safety and precautionary measures. They are not intended to conflict with, or supersede, any state or local statute or regulation; reference to such specific provisions should be made by the user. (See Rule II)

- I. **POST THESE SHORING SAFETY RULES** in a conspicuous place and be sure that all persons who erect, dismantle or use shoring frames are aware of them.
- II. **FOLLOW LOCAL CODES, ORDINANCES and REGULATIONS** pertaining to shoring.
- III. **INSPECT ALL EQUIPMENT BEFORE USING.** Never use any equipment that is damaged.
- IV. **A SHORING LAYOUT**—Should be available on the jobsite at all times.
- V. **INSPECT ERECTED SHORING AND FORMING:**
  - a. Immediately prior to pour - b. During pour - c. After pour until concrete is set.
- VI. **CONSULT YOUR SHORING EQUIPMENT SUPPLIER WHEN IN DOUBT.** Shoring is his business, **NEVER TAKE CHANCES.**

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| <p>A. <b>USE MANUFACTURER'S RECOMMENDED SAFE WORKING LOADS CONSISTENT WITH</b> the type of <b>SHORING FRAME</b> and the height from supporting sill to formwork.</p> <p>B. <b>DO NOT EXCEED THE SHORE FRAME SPACINGS OR TOWER HEIGHTS</b> as shown on the shoring layout.</p> <p>C. <b>SHORING LOAD SHOULD BE CARRIED ON LEGS.</b> Consult your shoring supplier for <b>SHORING FRAMES</b> that are designed for taking loads on top horizontal.</p> <p>D. <b>IF MOTORIZED CONCRETE EQUIPMENT</b> is to be used, be sure that the shoring layout has been designed for use with this equipment and such fact is noted on the layout.</p> <p>E. <b>PROVIDE AND MAINTAIN A SOLID FOOTING</b> to distribute maximum loads properly.</p> <p>F. <b>USE ADJUSTMENT SCREWS</b> to adjust to uneven grade conditions.</p> <p>G. <b>USE ADJUSTMENT SCREWS</b> to level-off, to accurately position the falsework and for easy stripping.</p> <p>H. <b>KEEP SCREW EXTENSIONS</b> to a minimum for maximum load carrying capacity (follow manufacturer's recommendation on screw extension).</p> <p>I. <b>MAKE CERTAIN THAT ALL ADJUSTMENT SCREWS</b> are firmly in contact with sills, formwork and frame legs.</p> | <p>J. <b>PLUMB AND LEVEL ALL SHORING FRAMES</b> as the erection proceeds. <b>DO NOT</b> force braces on frames to fit—level the shoring towers until proper fit can be made easily. <b>CHECK PLUMB AND LEVEL OF SHORING TOWERS</b> just prior to pour.</p> <p>K. <b>FASTEN ALL BRACES SECURELY.</b></p> <p>L. <b>TIE HIGH TOWERS OF SHORING FRAMES TOGETHER</b> with sufficient braces to make a rigid, solid unit (see manufacturer's recommendations).</p> <p>M. <b>EXERCISE CAUTION</b> in erecting or dismantling free standing shoring towers to prevent tipping.</p> <p>N. <b>DO NOT CLIMB CROSS BRACES.</b></p> <p>O. <b>AVOID ECCENTRIC LOADS ON U-HEADS,</b> top plates and similar members by centering stringers on those members.</p> <p>P. <b>USE SPECIAL PRECAUTIONS</b> when shoring from or to sloped surfaces.</p> <p>Q. <b>USE LUMBER STRESSES</b> as shown on layout and consistent with age, type and condition of the available lumber to be used. Use only lumber that is in good condition.</p> <p>R. <b>RESHORING PROCEDURE SHOULD BE APPROVED BY A QUALIFIED ENGINEER.</b></p> <p>S. <b>DO NOT REMOVE BRACES OR BACK-OFF ON ADJUSTMENT SCREWS</b> until proper authority is given.</p> |
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# RECORD OF PUBLIC DROWNINGS

January 1, 1971, through September 30, 1971

## Bureau-operated Facilities:

Canals	23
Reservoirs	3
Total	<u>26</u>

## Facilities Operated by Others:

Irrigation and Water Districts	23
State or County (Recreational)	41
Total	<u>64</u>

## Summary of Total Drownings During Period:

By Operating Agency:	
Bureau of Reclamation	26
Irrigation and Water Districts	23
State or County (Recreational)	41
Total	<u>90</u>

By Type of Facility:	
Canals	45
Reservoirs	45
Total	<u>90</u>

By Activity:	
Swimming	30
Boating	9
Fishing	5
Fell into water	26
Other	20
Total	<u>90</u>

By Age:	
Under 12 years of age	17
From 12 to 25	47
From 25 to 50	16
Over 50 years of age	10
Total	<u>90</u>

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## CSC ALCOHOLISM GUIDELINES

Under authority of Public Law 91-616, the Civil Service Commission has instructed Federal agencies to establish programs for the prevention and treatment of alcoholism by December 1.

Guidelines for such programs have been provided to Federal agencies. Proposed guidelines were circulated for comment in April 1971, and all suggestions were given careful consideration.

Agency programs must contain the following policy elements:

1. Alcoholism is recognized as a treatable illness.
2. Alcoholism is defined as an illness in which the employee's job performance is impaired as a direct consequence of the abuse of alcohol.
3. An employee having an illness or other problems related to the use of alcohol will receive the same careful consideration and offer of assistance that is presently extended to employees having any other illness.
4. The employing agency is not concerned with an employee's use of alcohol except as it may affect his job performance or the efficiency of the service.
5. No employee to whom the program applies will have his job security jeopardized by his request for counseling or referral assistance.
6. Medical records of employees with drinking problems will be preserved in the same degree of confidence as all other medical records.
7. Sick leave will be granted for treatment or rehabilitation on the same basis that it is granted in any other illness.
8. Employees who suspect they may have an alcoholism problem are encouraged voluntarily to seek counseling and information on an entirely confidential basis by contacting the individuals designated to provide such services.



## RECOGNIZING AND TREATING THE PROBLEM DRINKER

By Charles S. Brown, Director  
Vocational Rehabilitation Program  
Malcolm Bliss Mental Health Center

WHAT DOES ALCOHOLISM cost industry? Some states have estimated the figure at \$100 million. For all industry throughout the nation, it may be \$4 billion. Estimates from Dun and Bradstreet indicate a much higher national loss figure of \$7.5 million per year. One reason: After a three-martini lunch, an executive with the power to negotiate and sign contracts could cost a company \$1 million in five minutes.

These huge figures cover estimated annual losses to business through alcoholism from absenteeism, tardiness, sick leave, wasted time, inefficiency, accidents, bad judgment, wasted materials, poor workmanship, and loss of investment in trained manpower. Because the cost has reached staggering proportions, management throughout the United States is giving the problem increasing attention.

Who is the alcoholic?

We've learned, for example, that most alcoholics are not on Skid Row. Contrary to popular belief, less than 3 percent of the estimated 6-1/2 million alcoholics in the country are derelicts. Six out of seven alcoholics are intelligent people between the ages of 35 and 55. More than 70 percent reside in respectable neighborhoods, live with their husbands or wives, try to send their children to college, belong to the country club, attend church, pay taxes, and continue to perform more or less effectively as bank presidents, housewives, farmers, salesmen, machinists, stenographers, teachers, clergymen, physicians, and in other positions. According to the Rutgers University Center for Alcohol Studies, one-half of America's alcoholics are employed by industry.

Theirs is a medical problem--the fourth largest health problem in the United States, and one that causes family, personal, and job-related problems.

A progressive disease

An alcoholic is a person who cannot control his drinking. In the early and middle stages of the disease, the still-employed person may be termed a problem drinker. From management's viewpoint, a problem drinker is an employee who repetitively uses alcohol in a manner that seriously reduces his effectiveness in carrying out work assignments. However, because the problem drinker's behavior is not so deviant as that of the chronic final-stage alcoholic, it

is more difficult for management to recognize him. To an outside observer, he may seem normal. But there are some on-the-job signs of the problem drinker. Listed here are but a few:

- Hangover on the job.
- Drinking before going to work.
- Absenteeism, half or full day.
- Increased nervousness, jitteriness.
- Drinking at lunch time.
- Hand tremors.
- Drinking during working hours.
- Lateness in coming to work.
- More unusual excuses for absence.
- Early departure from work.
- Temporary desertion of post.
- Avoidance of boss or associates.
- Use of breath purifiers.
- Longer lunch periods.
- Red or bleary eyes.

### Chance for recovery

The largest recovery rates, surprisingly, are to be found not in clinics and hospitals but in offices and in factories. By putting the body of knowledge about alcoholism to work in company programs, industry is achieving recovery rates as high as 65 to 70 percent--higher than those for other major diseases and far higher than imagined only a short time ago.

How can we account for this higher recovery rate among employed problem drinkers? The most important aspect of a successful recovery from alcoholism is the motivation to accept treatment rather than the treatment itself. Industry has the most effective motivational tool known to date--the employee's desire to hold his job.

### Referral services

Treatment programs vary considerably for problem drinkers within a given company and are determined to some extent by the referral resources that are available within the community. If physical deterioration is extensive, the employee may have to be hospitalized for a short time. Usually, however, he is simply referred to a psychiatrist, outside physician, counselor, clergyman, the local council on alcoholism, or to Alcoholics Anonymous. Though company programs differ, a common measure is referral to outside resource agencies, as most experts agree that companies themselves are no more qualified to treat alcoholism than they are to deal with cancer.

The treatment resources outlined are available even to small companies that may have no medical department. Big companies, middle-sized companies, and small companies are learning that a drinking problem can be recognized and treated just as any other health problem can be. The man can regain his health and continue to be a productive member of the labor force.

### The supervisor's role

Supervisors play the key role in any company alcoholism program. In carrying out this delicate role, the supervisor must recognize that alcoholism is an extremely complex illness requiring professional diagnosis and treatment. The supervisor's primary role is to recognize and identify employee behavioral patterns that indicate, but do not always prove, a condition of developing alcoholism.

Once the identification of the problem drinker has been made, through observation of job performance and documentation, most successful company alcoholism programs utilize some type of crisis precipitation device or confrontation technique to motivate the employee to accept help. Industry is in an excellent position to fight alcoholism because it is organized and can deal with the early stages of the problem with a reward as well as with a penalty. A company can offer the advantages of fringe benefits, medical coverage, and even the job itself as an incentive for the employee to make a serious effort at recovery.

There is an alternative, of course. Left untreated and unhelped, the alcoholic will sooner or later be dismissed. The cost of this, however, is expensive--both for the company and for the community, not to mention the cost to the employee and his family. Rehabilitation, on the other hand, is a paying proposition.

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## THE AGE OF ENVIRONMENTAL AWAKENING

In the long view, 1970 may be pinpointed as the start of the Environmental Renaissance. It was the first time in history that anyone thought of setting aside a day to honor the Earth itself. Earth Day - a spontaneous movement arising from deep-rooted love of the land and remorse for the ways it is being despoiled; a reminder that man and his environment are all parts of the same package - a thing called life.

When at last man attained his age-old yearning to reach the moon, he learned, in the first moments of exploring its bleak surface, to appreciate the Earth with the fullness of commitment to it. He saw the Earth at last for what it is - finite and fragile, but altogether wonderful, an object of more complexity than all his sophisticated technology can match. Man has come to understand that his future will not be determined by stargazing, but by learning to protect the frail structure of his own planet.

Thus a new dimension is being added to the political character of the world's nations, our own included. An environmental ethic is rising out of man-induced environmental catastrophes.

In its best moments, the American national character - the attitudes and dreams of its people - have reflected the greatness of this piece of geography we call the United States.

In moments not so admirable, the American national character has reflected the ailments that we, the people, have inflicted upon the land. As the land is torn, so the people are torn.

The year 1970 was the time when we began in earnest to take stock of ourselves and the environment we have created. It was a year of more than will-o-the-wisp awareness that all is not well. It was a year of action to restore compatibility to the relationship between man and nature.

Ecologists, environmentalists, conservationists, a rising number of industrialists motivated by social conscience, and an army of the general public went to war on pollution.

Detergents, plastics, auto engines, pesticides, fungicides, fertilizers, herbicides and poisonous chemicals used in manufacturing and food processing all came under attack.

Ammunition was plentiful, in the form of vital statistics indicting the life styles and value systems that were leading us to diminishing returns of comfort, health, safety and security.



Jacques Cousteau, noted explorer of the underwater world, reported in 1970 that during the past 20 years 40 percent of life in the oceans has been choked off.

A Florida teenager contracted a mysterious and fatal ailment - reported to have been caused by toxins absorbed while he was scuba diving in a lake near his home.

The children in a New Mexico family were paralyzed and blinded from mercury poisoning traced to the protective coating on seed used as feed for hogs the family raised for its own food supply.

Residents along the shores of Lake George in New York State were warned not to eat fish caught there because of the lethal levels of mercury contamination. Federal authorities seized thousands of pounds of DDT-contaminated kingfish caught off the Los Angeles coast.

And there are other less specific but more pervasive evidences of a decline in the overall environment in which Americans have been living. The swift and haphazard materialization of the megalopolis has brought suffocating congestion to airways and roadways, caused power blackouts threatening the health and safety of millions, and forced center cities to congeal into overcrowded population pockets plagued by social and health problems. The National Institute of Environmental Health Sciences reported in 1970 that ill health induced by unfavorable environmental conditions costs Americans \$35 billion a year.

Yet, all of these signs of malaise are only one part of the 1970 picture. The record of progress in environmental quality control is worthy, indeed.

Water quality standards for all 50 states were approved, and prosecution became a matter of hard policy against industries contaminating American waters thermally, chemically, or with metals, oil, sewage or other waste.

Deadly pesticides - and unsightly billboards - were banned on all Federal lands under jurisdiction of the Interior Department. The importation of numerous endangered wildlife species, or products derived from them, was prohibited under new, stiff Interior regulations.

Environmental protection became a built-in first step in planning pipelines, powerplants and powerlines on Federal lands under Interior's administration.

Wilderness and scenic regions in the vicinity of metropolitan areas were saved from indiscriminate uses in many parts of the country. For example, a super jetport near the Florida Everglades was halted at midpoint because of its potential threat to the fragile ecology and unique wildlife in the area.

Studies began for developing major recreation areas adjoining 13 of America's most crowded cities. Congress authorized substantial increases in money for acquiring open space land under the Land and Water Conservation Fund.

Curriculum materials and study centers for environmental education were developed under Interior's aegis - and the President signed into law the Environmental Education Act for community education, teacher training and special programs for community, business and labor groups and government employees.

The year 1970 also brought forth the first report of the Council on Environmental Quality which President Nixon created in late 1969. The report spelled out, with clarity and forthrightness, the environmental state of the union. It probed such matters as "misplaced economic incentives," the information gap between technology and the public, the value systems that motivate us and the limitations of governmental units. It also critically examined land-use policies, the extent of water and air pollution, the effects of pollution from noise, pesticides and radiation, and man's modification of weather and climate. It called for environmental education programs, financial reforms for environmental control, monitoring and research systems and a comprehensive environmental control policy.

Also created in 1970 were the Environmental Protection Agency and the National Oceanographic and Atmospheric Administration.

And, near the close of the year, the President signed a Joint Resolution of the Congress proclaiming that "Clean Waters for America Week" be observed the first full calendar week in May each year.

By no means all the action took place at the Federal level. Perhaps one of the most significant State-level developments in 1970 was the concerted effort to improve the effectiveness of State agencies dealing with environmental problems. And the National Conference of Governors established a National Resources and Environmental Management Committee naming Governor Curtis of Maine as chairman.

The direction of the States' interests are typified by language in the State of Washington's new law establishing a Department of Ecology. The law says: ". . . the legislature recognizes that as the population of our State grows, the need to provide for our increasing industrial, agricultural, residential, social, recreational, economic and other needs will place an increasing responsibility on all segments of our society to plan, coordinate, restore and regulate the utilization of our natural resources. . ."

Something as mundane as the District of Columbia telephone directory for 1970 gives a clue to the extent of public concern. No fewer than 28 listings appear under the prefix "enviro" - private groups, industries and citizen organizations devoted to environmental projects and issues. In 1960, there were no such listings in the Nation's Capital.

In this spirit the journey continued in 1970 toward an environmental ethic.

President Nixon set the tone in his State of the Union message. In the next 10 years, he reminded all Americans, we shall increase our wealth by 50 percent. But, he asked, does this mean that we will be 50 percent richer in a real sense, 50 percent better off, 50 percent happier?

He responded to his own questions in these words: "The answer is not to abandon growth but to redirect it. . . . America, which has pioneered in the new abundance and in the new technology is being called upon today to pioneer in meeting the concerns which follow in their wake - in turning the wonders of science to the service of man. . . ."

We begin by counting our blessings.

Our national assets include a population of well over 200 million human beings, nearly 59 million of whom are still in school, and some 80 plus million of whom constitute our employable strength. The educational level of Americans is rising dramatically, with college enrollments doubling between 1960 and 1970.

We have cattle valued at \$17 billion, hogs valued at \$1.8 billion, sheep valued at \$466 million. Our farm crops yield abundantly such staples as cotton, corn, rice, peanuts, wheat, oats, potatoes, hay, barley, soybeans, flaxseed, to name but the biggest.

Mineral production figures show the United States leading the world in output of aluminum, bituminous coal, copper, natural gas, steel, potash and sulphur. We also produce a huge share of the world's crude oil.

We have nearly 4 million miles of U.S. Highways and nine of the 10 busiest airports in the world. We lead the world in nuclear power capability, with a potential seven times that of the Soviet Union. Our electrical energy output per capita is three times that of the Soviet Union and is rivaled only by Sweden. Our streams average a flow of 1,200 billion gallons of water per day, many times the daily average consumption in a country that is a giant consumer.

The United States of America adds up to 3.6 million square miles of verdant plains, vast timberlands, lakes, rivers and some of the most scenic mountain and valley regions in the world, with climates to suit any taste.

And we have acquired the sense of necessity for planning on a national and even global scale for environmental quality.

Thus we have the makings of civilization as Herbert Spencer defined the word - "a progress from an indefinite, incoherent homogeneity toward a definite, coherent heterogeneity."

The President summed up our condition and our prospects in his Message to Congress transmitting the first report of the Council on Environmental Quality:

"At the heart of concern for the environment lies our concern for the human condition: for the welfare of man himself, now and in the future. As we look ahead to the end of this new decade of heightened environmental awareness, therefore, we should set ourselves a higher goal than merely remedying the damage wrought in decades past. We should strive for an environment that not only sustains life but enriches life, harmonizing the works of man and nature for the greater good of all."

Excerpted from "Our Living Land," the U.S. Department of the Interior's new 96-page Environmental Report, available for \$2 from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. This conservation yearbook is illustrated with color photographs and paintings, and the text covers the full range of the United States ecological and environmental problems and Interior's role in resolving the present national dilemma.

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# OFF THE JOB SAFETY

## HOUSEHOLD HAZARDS

They're all around us. Be safe, prevent them. A call for the ambulance may be just a step away.

As more and more appliances, tools, cleaning agents, drugs, insecticides, and a great variety of home-use chemicals come into the home, hazards to persons, especially to children, will continue to increase. Home accidents claimed the lives of 27,000 people in 1970, and close to 4 million people became disabled. There are so many ways in which accidents can occur in and around the house and yard nowadays that it has become very difficult indeed to recognize all the possibilities and so to be able to take the necessary steps to prevent dangerous, and often fatal, poisoning or other injury.

Each year, many thousands of children swallow such common household products as cleaning aids, solvents, drugs, fuels, and strong detergents, and a large number of these children suffer severe poisoning and are gravely injured. Many of these children die. Many persons, adults and children, are injured, some fatally, through misuse of appliances and other common products, mostly as a result of careless safeguarding, handling, and storage. The tragedy of most home accidents is that they could have been avoided with knowledge, care, and watchfulness.

Some accidents simply end in discomfort. An example is the skin rash that develops after the family clothes are washed with fiber-glass curtains, or if the washing machine has not been rinsed thoroughly to remove the tiny sharp splinters of glass fibers. Often, however, the results of a mistake in judgment are more serious, and at times they bring disaster.

Chemicals account for a good many accidents in the home. A large number of these involve young children who cannot read or understand cautionary labels. Children have an unending curiosity and a desire to handle and taste or ingest any substance they can get into their mouths that looks or smells like candy or some familiar liquid, like water or a soft drink. Unfortunately, any of the substances experimented with could be a dangerous product. For example, vitamin pills that look like bubble gum, or aspirin tablets or laxatives that have a pleasant taste or look like orange candy or chocolate candy can invite trouble; overdoses of aspirin have brought death to many children. Deodorant blocks (paradichlorobenzene) in diaper pails and bubble-bath soaps in brightly colored gelatinous cylinders which look like candy can cause a serious ailment. Household cements, glues, paints, lacquers and enamels may cause illness from inhalation of their vapors or dermatitis from contact with the

skin. The fumes of many paints and lacquers are extremely poisonous, or flammable. Aerosol containers of all kinds present a special problem for children; they must never be kept where children have access to them.

Whenever there are young children around, care should be taken to keep all medicines and practically all household chemicals, solvents, paints, cleaning and polishing materials, bleaches, kerosene, disinfectants, and pesticides--to name a few--out of the reach of children. Some items should be locked up securely, away from all possible access by children. Remember that youngsters often find ways to climb to a high shelf or cabinet, and placing these items on a high level in kitchen, pantry, or bathroom has often proved to be an insufficient safeguard.

Drain cleaners are specially dangerous as poisons gravely injuring children. They contain an extremely caustic chemical, and the cans have been known to explode, resulting in blindness.

Not all risks are run by children. Adults account for more than their share, with electrical appliances, rotary lawn mowers, snow plows, incorrect use of cleaning agents, or misuse of power tools. The U. S. Public Health Service reports that about 100,000 Americans--one third of them children--are injured each year in accidents involving glass doors. To avoid the hazard, transparent glass doors should be marked by conspicuous opaque markers to reveal their presence and to show that the doors are closed.

Many deaths and grave injuries have followed the bullet-like impact of a piece of wire or hardware launched by the blades of a rotary mower. Falls on slippery floors are large contributors also to the home accident rate. People often overlook, until it is too late, some glaring hazards that exist in homes, including the possibility of slipping on a spot of grease spilled on the floor, on a loose scatter rug or an insecure board or carpet on a stairway. Taking a bath while using an electrical appliance, such as a portable hair dryer, manicure set, or with a radio or electric heater within reach has also been a cause of sudden death.

Another household hazard that is often ignored is faulty wiring inside and outside the home, particularly from worn insulation, or defective extension cords. These conditions can eventually lead to electrical shock and electrocution and they have caused many fatal fires. Electric blankets and heating pads have caused many home fires and deaths due to electrical faults or to misuse.

Impatience sometimes will lead a person into trouble. Women, for example, are always seeking a speedy, convenient way to clean, and frequently will resort to unorthodox, untested methods to achieve this. Mixing a chemical cleaner with chlorine bleach or using several

times the recommended amount of a cleaner for a given job on the theory that the combination or twice as much of a product must work more effectively can get one into trouble. Combining household ammonia or other cleaning agents (other than soaps or synthetic detergents) with chlorine bleach can produce a gas that is extremely harmful to the lungs and may even cause death.

The man of the house should practice patience also. Removal of the safety guard on a circular saw to make it easier and more convenient to use the saw in some circumstances greatly increases the risk of serious injury.

People have sliced their fingers on cans, they have been hit by fragments of exploding aerosol cans, spattered with hot grease or burned in fire starting an overheated fryer, received a mild or severe shock from a faulty plug or switch, or an appliance. A grave or fatal injury may be sustained through jumping or flinching as a result of a cut, hit, burn, or slight electric shock. Thus, a relatively minor incident can cause a more serious one and result in a more dangerous and even permanent injury, through a resulting fall from a ladder or a fall against a sharp hard surface of a kitchen appliance or cupboard. Careless use of ladders causes many serious injuries, often with broken bones and a long period of hospital care.

No one can be too careful. Taking the necessary precautions to prevent an accident from happening, by wiping up at once spilled grease or cream or other thick liquid, may seem unnecessary at the moment or not worth the effort required, before the accident. Due care can, however, eliminate the possibility of endless hours of pain in recuperating from an injury, skull fracture, or burn, plus medical and hospital expenses and the possibility of some degree of permanent disability. Many thousands of people each year learn too late--after the accident--that they should have followed, throughout their lives, some well established rules of safety.

Because of the growing number of hazards that beset us and because of the need to guard the safety of each member of the family, it is good policy to advise and teach all members of the household on the need for being careful, so that they will become safety-minded and thus be able to recognize and guard themselves and others against the many hazards that exist in mechanized, chemicalized conditions of modern living.

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# SAFETY PERFORMANCE RECORD

## CUMULATIVE QUARTERLY REPORT GOVERNMENT FORCES

3rd QUARTER, 1921

PERIOD FROM JANUARY 1, 1921... THROUGH September 30, 1921...

REPORTING OFFICE	NUMBER OF EMPLOYEES	MAN HOURS	DISABLING INJURIES		DAYS LOST	FREQUENCY RATE	SEVERITY RATE
			CUMULATIVE THIS YEAR	CUMULATIVE THIS YEAR			
Washington Office	257	416,976					
Denver Office	1,225	1,909,856	1		31	0.5	16
REGION 1							
Boise Regional Office	177	254,358					
Central Snake Project	40	54,892	1		26	18.2	674
Chief Joseph Dam	25	40,238					
Columbia Basin Project	234	370,848					
Grand Coulee Dam Operations	350	488,149					
Green Springs Powerplant	2	3,070					
Hungry Horse Project	44	57,275					
Lower Columbia Planning Office	38	57,333					
Lower Teton Project Office	15	13,621					
Minidoka Project	68	107,145	1		55	9.3	511
SNAKE RIVER PLANNING OFFICE	39	61,260					
Third Powerplant Constr. Office	229	332,457	1		53	3.0	159
Tualatin Project Office	14	16,127					
Upper Columbia Planning Office	35	52,168					
Yakima Project Office	30	40,571					
Totals & Averages	1,340	1,949,512	3		134	1.5	69
REGION 2							
Sacramento Regional Office	477	847,060					
Regional Drill Crew	22	36,601	1		23	27.3	628
Auburn-Folsom South Unit CVP Office	220	348,964					
Cachuma Operations Field Branch	2	3,888					
Central Coast Dev. Field Branch	3	5,304					
Folsom Field Division	73	118,576					
Fresno CVP Construction Office	123	186,195					
Fresno Field Division	135	210,008	1		5	4.8	24
Klamath Project Office	17	25,122					
Lahontan Basin Projects Office	21	32,568					
Sacramento Valley CVP Construction Office	68	122,952					
San Luis Unit CVP Construction Off.	47	73,090					
Shasta Field Division	136	214,899	1		21	4.7	98
Solano Operations Field Branch	2	3,040					
Tracy Field Division	159	253,929	1		20	3.9	79
Totals & Averages	1,505	2,482,196	4		69	1.6	28
REGION 3							
Boulder City Regional Office	178	272,000					
Boulder Canyon Project	159	231,269					
Dixie Project Office		4,212					
Lower Colorado River Project	153	250,328	3		61	12.0	244
Parker-Davis Project	127	503,258	3		38	6.0	76
Phoenix Development Office	91	138,720					
Southern California Dev. Office	20	26,777					
Southern Nevada Water Project	27	86,637					
Yuma Projects Office	124	187,200					
Totals & Averages	1,079	1,700,401	6		99	3.5	58
REGION 4							
Salt Lake City Regional Office	215	317,782					
Central Utah Projects	197	288,592					
CBSP Power Operations - Montrose	272	392,148	4		86	10.2	219
Durango Projects Office	39	46,453					
Grand Junction Projects Office	117	169,719					
Logan Development Office	5	7,800					
Lyman Project Office	10	17,878					
Upper Green River Projects Office	18	28,652					
Totals & Averages	873	1,269,024	4		86	3.2	68
REGION 5							
Amarillo Regional Office	97	144,899					
Albuquerque Development Office	30	48,806					
Austin Development Office	38	60,820					
Loan Program Projects Office	1	1,560					
Middle Rio Grande Project	206	357,331					
Mountain Park Project	40	24,066					
Navajo Project	83	133,784					
Oklahoma City Development Office	18	25,252					
Pecos River Office	19	28,811					
Rio Grande Project	183	282,830	1		4	3.5	14
San Juan-Chama Project	23	55,324					
Totals & Averages	738	1,151,683	1		4	0.9	3
CONSOLIDATED TOTALS							
TOTALS LAST YEAR (1920)							

\*FATALITIES INCLUDED IN TOTAL DISABLING





# SAFETY PERFORMANCE RECORD

## CUMULATIVE QUARTERLY REPORT

### CONTRACTOR FORCES

3rd QUARTER, 1971

PERIOD FROM JANUARY 1, 1971... THROUGH September 30, 1971...

REPORTING OFFICE	NUMBER OF EMPLOYEES	MAN HOURS	DISABLING INJURIES		DAYS LOST	FREQUENCY RATE	SEVERITY RATE
		CUMULATIVE THIS YEAR	CUMULATIVE THIS YEAR	FATAL #	CUMULATIVE THIS YEAR	CUMULATIVE THIS YEAR	CUMULATIVE THIS YEAR
REGION 1							
Boise Regional Office		14,409					
Columbia Basin Project	40	75,331	1		60	13.3	796
Grand Coulee Dam Operations Office		2,642					
Hungry Horse Project	3	1,599					
Lower Teton Field Station		722					
Third Powerplant Construction Office	1,564	2,050,247	2		309	1.0	151
Tualatin Project	4	152					
Yakima Project	11	9,008	1		21	111.0	2,331
Totals & Averages	1,622	2,154,110	4		390	1.9	181
REGION 2							
Sacramento Regional Office		25,333					
Auburn-Folsom South Unit CVP Construction Office	489	384,459	4		26	10.4	68
Fresno CVP Construction Office	204	134,258					
Fresno Field Division		2,339					
Klamath Projects Office		180					
Sacramento Valley CVP Constr. Office	79	35,014					
San Luis Unit CVP Construction Office	61	58,421					
Tracy Field Division		4,114					
Totals & Averages	833	644,118	4		26	6.2	40
REGION 3							
Boulder Canyon Project	8	1,015					
Lower Colorado River Project	20	19,091					
Parker-Davis Project	1	1,088					
Phoenix Development Office		7,052					
Southern Nevada Water Project		232,853	3		45	12.9	193
Yuma Projects Office	7	25,758					
Totals & Averages	36	286,860	3		45	10.5	157
REGION 4							
Salt Lake City Regional Office		4,689					
Central Utah Projects	181	372,982					
CRSP Power Operations - Montrose		720					
Grand Junction Projects Office	17	61,952	1		20	16.1	323
Lyman Project	2	13,424					
Upper Green River Projects		8,195					
Totals & Averages	200	461,962	1		20	2.2	93
REGION 5							
Mountain Park Project	13	2,180					
Navajo Project	203	210,127	9		142	42.8	676
Pecos River Office	10	16,180					
San Juan-Chama Project	8	29,273					
Totals & Averages	234	252,760	9		142	35.6	562
REGION 6							
Missouri-Osage Projects	52	33,818					
Missouri-Souris Projects	240	217,599	2		65	9.2	299
Riverton Project	13	8,805					
Upper Missouri Projects		12,520					
Totals & Averages	305	272,742	2		65	7.3	238
REGION 7							
Fryingpan-Arkansas Projects	556	1,031,881	18		325	17.4	315
Kansas River Projects	23	32,645					
North Platte River Projects	30	21,218					
South Platte River Projects		752					
Totals & Averages	609	1,086,496	18		325	16.5	299
CONSOLIDATED TOTALS							
	3,839	5,159,048	41		1,013	7.9	196
TOTALS LAST YEAR (1970)							
	2,858	5,645,066	47	1	9,363	8.3	1,659







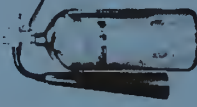







\*FATALITIES INCLUDED IN TOTAL DISABLING







# KNOW YOUR FIRE EXTINGUISHERS

TYPE OF EXTINGUISHER	WATER			FOAM	CARBON DIOXIDE	DRY CHEMICAL				
	STORED PRESSURE	CARTRIDGE OPERATED	PUMP TANK			SODIUM OR POTAS- Sium BICARBONATE		MULTI-PURPOSE ABC		
								STORED PRESSURE	CARTRIDGE OPERATED	STORED PRESSURE
										
CLASS OF FIRE		YES	YES	YES	YES	NO	NO	NO	YES	YES
		NO	NO	NO	NO	YES	YES	YES	YES	YES
		NO	NO	NO	NO	NO	YES	YES	YES	YES
USUAL OPERATION	PULL PIN SQUEEZE HANDLE	PULL PIN SQUEEZE HANDLE	PUMP HANDLE	TURN UPSIDE DOWN	TURN UPSIDE DOWN	PULL PIN SQUEEZE HANDLE	PULL PIN SQUEEZE HANDLE	PULL PIN SQUEEZE HANDLE	PULL PIN SQUEEZE HANDLE	PULL PIN SQUEEZE HANDLE
RANGE	30'-40'	30'-40'	30'-40'	30'-40'	30'-40'	3'-8'	5'-20'	5'-20'	5'-20'	5'-20'
DISCHARGE TIME	1 MINUTE	1 MINUTE	1 MINUTE	1 MINUTE	1 MINUTE	8-30 SEC.	8-25 SEC.	8-25 SEC.	8-25 SEC.	8-25 SEC.
SIZES	2½ GAL.	2½ GAL.	2½ - 5 GAL.	2½ GAL.	2½ GAL.	2-20 LBS.	1-30 LBS.	2½-30 LBS.	2½-30 LBS.	8½-30 LBS.



# RECLAMATION SAFETY NEWS

**ZERO**  
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**ON SAFETY..**

*Fourth Quarter and  
Annual Report 1971*

UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF RECLAMATION  
ENGINEERING AND RESEARCH CENTER  
DENVER, COLORADO

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E&R Center

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of accident prevention.

# BUREAU SAFETY PERFORMANCE

## 1971 CUMULATIVE ACCIDENT RECORD

January 1 - December 31, 1971

### A. GOVERNMENT FORCES

<u>Region</u>	<u>Injury index*</u>	<u>Frequency rate</u>	<u>Severity rate</u>	<u>Vehicle accident rate*</u>
Region 1	48.5	2.0	2,424	6.8
Region 2	0.4	1.5	24	2.5
Region 3	2.1	3.1	68	4.4
Region 4	6.0	4.8	124	2.0
Region 5	0.1	1.3	11	2.1
Region 6	0.0	0.0	0	2.7
Region 7	<u>0.2</u>	<u>1.7</u>	<u>12</u>	<u>2.9</u>
Totals 1971	6.4	1.7	374	3.3
<hr/>				
Totals 1970	11.2	1.8	620	2.6

\*Injury index is equal to frequency rate times severity rate divided by 100.  
Vehicle accident rate is the number of accidents per million miles driven.

### B. CONTRACTOR FORCES

<u>Region</u>	<u>Injury index</u>	<u>Frequency rate</u>	<u>Severity rate</u>	<u>Fatal injuries</u>
Region 1	5.0	2.5	201	0
Region 2	15.3	8.8	174	0
Region 3	14.7	9.9	148	0
Region 4	1.8	3.7	49	0
Region 5	331.5	37.5	884	0
Region 6	32.0	9.9	323	0
Region 7	<u>32.9</u>	<u>13.5</u>	<u>244</u>	<u>0</u>
Totals 1971	19.8	8.4	236	0
<hr/>				
Totals 1970	137.7	8.3	1,659	1

### BUREAU CONTRACTORS' 3-YEAR AVERAGE (1969-1971)

Frequency rate: 9.4  
Severity rate: 1,667



### C. RECLAMATION CIVILIAN CONSERVATION CENTERS

Frequency rate	0.6
Severity rate	8
Vehicle accident rate	27.1

### D. LOST TIME ACCIDENT ANALYSIS - GOVERNMENT FORCES 1971

#### Accident Classification:

<u>Description</u>	<u>No.</u>	<u>Days lost</u>
Lifting	1	21
Vehicles	6	123
Striking against objects	2	26
Struck by objects	4	99
Eye injuries (struck by)	2	20
Caught in or between	1	60
Cave-in	1	6,000
Fall - on same level	4	89
Fall - to different level	6	161
Slip or twist	5*	82*
Electrical shock	<u>1</u>	<u>12</u>
Totals	33*	6,693*

---

\* Includes two Job Corps staff members with a total of 40 days lost time.

### E. SERIOUS ACCIDENTS - BUREAU EMPLOYEES

A Region 1 employee was fatally injured as a result of a trench cave-in on December 8, 1971.

Three Region 4 employees were injured on October 27, 1971, when a damaged 100-foot VHF radio tower on which they were working broke loose from its base and fell over.

### F. SERIOUS ACCIDENTS - CONTRACTOR EMPLOYEES

A contractor employee in Region 1 suffered a permanent partial disabling injury when he caught his thumb in the gate of a concrete bucket, resulting in a scheduled charge of 300 days lost.

A contractor employee in Region 5 suffered a permanent partial disabling injury when a muck car ran over his foot, resulting in a scheduled charge of 150 days lost time for amputation of the distal phalange of his great toe.

# TREND AND OUTLOOK

**GOVERNMENT FORCES** - During 1971, Bureau employees worked 17,781,946 man-hours, experiencing only 31 disabling injuries, including one fatality. The resulting accident frequency rate of 1.7 represents the third best frequency rate in Reclamation history and can be considered a commendable safety achievement. The vehicle accident frequency rate increased over 25 percent to 3.3, as compared with 2.6 vehicle accidents per 1,000,000 miles driven in 1970. This increase points up the need to initiate effective measures to cope with the greatest hazard facing Bureau employees - Vehicle Accidents. The total direct cost of accidents, including disabling injuries, fires, claims, motor vehicle accidents and property damage, was \$256,540, compared with \$366,493 the preceding year. In fact, this is the lowest accident cost figure experienced in the past 5 years.

**PUBLIC SAFETY** - In spite of our efforts to curb drownings on Bureau-operated canals and reservoirs, there were three more drownings in 1971 than in 1970. A total of 28 persons lost their lives in Bureau-operated canals as compared with 25 in 1970 and 31 in 1969. Considering the pyramiding exposure on our lakes and reservoirs, this can still be termed a commendable safety record. Equally encouraging was the decrease in drownings on Bureau-constructed waterways operated by water districts and others.

**JOB CORPS CIVILIAN CONSERVATION CENTERS** - Except for vehicle accidents, the Bureau-administered Civilian Conservation Centers continued to enjoy exemplary safety records. The efforts of the Job Corps Center Directors and their staffs to provide a safe work environment is reflected in the fact that only two staff members and one corpsman suffered relatively minor disabling injuries in 1971.

Equally gratifying is the fact that the Bureau administered four Youth Conservation Corps Camps, with approximately 200 youths, during the summer of 1971 without a single youth suffering a serious injury.

**CONTRACTORS FORCES** - During calendar year 1971, Bureau contractor employees worked 6,780,040 man-hours, experiencing 57 disabling injuries. The resulting accident frequency rate of 8.4 accidents per million man-hours worked was the second lowest in Reclamation history. More gratifying was the fact that another precedent was established - in 1971 not a single Bureau contractor employee suffered a fatal injury - the first time in Bureau history! This accomplishment is doubly gratifying considering the fact that over 30 percent of the man-hour exposure during the year was in tunnel construction - a comparatively hazardous operation.

OBJECTIVES FOR 1972 - During 1972 the Bureau will continue to seek solutions to accident prevention problems and to improve the accident frequency rate by ZEROING IN on specific health and safety objectives. Passage of the Occupational Safety and Health Act of 1970, with the adoption of consensus health and safety standards applicable to both Federal agencies and industry, dictates the need to undertake a Bureau-wide familiarization program. As a result, our main effort will be directed toward the promotion of health and safety education and training - acquainting employees and supervisors with the Federal safety and health standards. Also, we intend to expand the environmental health programs initiated in 1969 with the objective of insuring a totally safe and healthful working environment for Bureau employees. Following is a list of specific objectives sought in 1972, together with a brief description of the method of implementation:

Standards Awareness Program. The Commissioner of Reclamation has provided all operating offices with copies of Executive Order No. 11612 stating that all Bureau activities and operations are subject to compliance with Part 1910, Occupational Safety and Health Standards, published in the May 29, 1971 Federal Register, Volume 36, Number 105, Part II. Each region will coordinate the implementation of the standards to its activities and establish an educational program in order to familiarize personnel with the new safety and health standards. Such familiarization will extend to all activities, i.e., project planning, design, construction, operation and maintenance. Inspections will be conducted by regional and operating office safety personnel to determine degree of compliance with the standards.

Contractor Safety. With the Commissioner's recent announcement, greater emphasis is to be placed upon the enforcement of the safety and health standards for construction. The familiarization program initiated last year for the purpose of acquainting all construction inspectors with the standards is continuing.

At the February 1972 Construction Engineers' Workshop the new Federal safety legislation was reviewed and construction engineers were informed of their responsibility for enforcement. Bureau policy requires that all Bureau construction inspectors be familiar with the safety and health standards and enforce them on work under their direction. In Reclamation, health and safety is considered as important as the quality of the product.

Noise Control and Hearing Conservation. During 1971 we continued to improve and expand our efforts toward elimination of any possibility of our employees or the public being exposed to harmful noise levels. Under the program, sound surveys have been conducted in virtually every powerplant and pumping plant in the Bureau. Through the media of design and engineering, efforts

are being made to eliminate harmful noise emissions. Where this is neither practical nor feasible, employees are provided with ear protection to be worn in areas designated as potentially hazardous. Most regions have implemented the audiometric testing program, and employees exposed to high noise levels are undergoing periodic tests to insure that they will not suffer hearing loss.

A refresher training course for Bureau sound technicians, safety personnel and others participating in the program is scheduled for March 21 and 22, 1972. In addition, a 1-day session on environmental noise (public) associated with heavy construction operations will be attended by project planning and construction supervisors.

Physical Fitness Qualification Program. It is anticipated that the Commissioner will announce the inception of a Bureau-wide physical fitness program. The program under consideration, and successfully being carried out in two regions, provides for periodic physical examinations for all employees engaged in hazardous and/or arduous occupations.

Drillers Safety Handbook. Over the years, Bureau employees engaged in drilling operations have suffered a disproportionate number of disabling injuries. Last year a committee was selected to survey the problems and to recommend solutions. One of the major recommendations was the need for a Drillers Safety Handbook setting forth health and safety practices to be observed in drilling. As a result, a draft of the manual has been prepared with publication of the manual expected during 1972.

Safety Training. Safety training and indoctrination is the cornerstone upon which successful safety programs are built. Recognizing this fact, emphasis will continue to be placed on safety training in an ever-expanding effort to make safety awareness an integral part of all facets of Bureau operations.

During 1971, 1,722 Bureau employees completed courses in defensive driving. Since inception of the National Safety Council Driver Improvement Program in 1965, there has been a total count of 13,925 completing driver improvement and defensive driver courses. This large number is accounted for by turnover of personnel and employees taking refresher courses.

Safety training for construction personnel was given to 242 Bureau employees during 1971. A total of 1,370 employees completed the 30-hour Safety Training Course for Construction Supervisors during the period 1965-1970. Safety training for construction personnel is presently being updated and expanded.



First-aid training was completed by 1,537 employees during 1971, and 376 Power Operation and Maintenance employees received barehand live-line training. Safety training to familiarize employees with the Bureau's new Power System Safety Standards was begun in 1971. In addition, training courses in motorboat safety, radial arm saw safety, etc., were given during 1971 and will continue to be given at offices where such training is applicable.

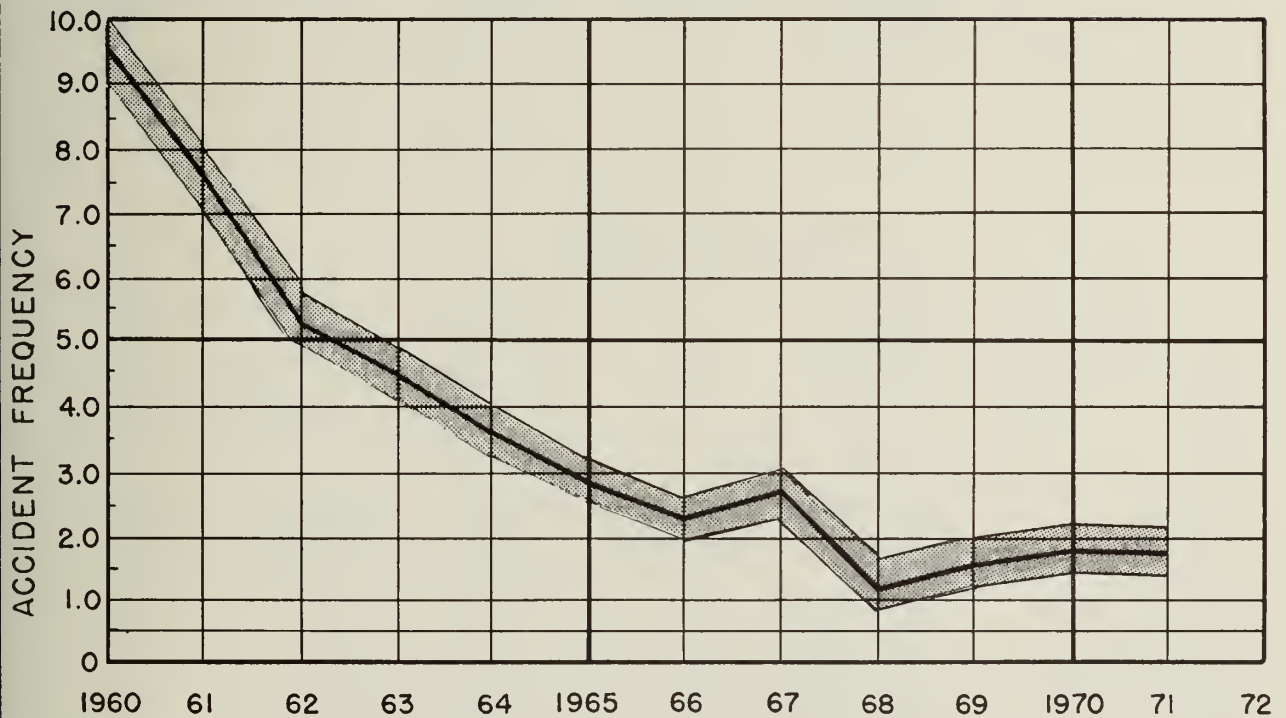
Public Safety. In September 1971 a research report entitled "Reducing Hazards to People and Animals on Reclamation Canals" was published. In addition to presenting a detailed survey of drownings of people and animals, the report discusses methods of reducing these drownings. As a result of the study, plans are underway to revise and expand our public water safety program in order to provide greater protection for the public and animals. The plan provides for greater emphasis on canal safety at all organizational levels, i. e., project planning, design, operation and maintenance. For example, greater consideration will be given to placing canals and laterals in closed conduits - also current Bureau canal hazard classifications and fencing criteria are to be revised, resulting in more miles of canal being protected by fencing.

ZERO IN ON SAFETY - In order to accomplish the above objectives and further improve the safety record, the commitment to accident-free performance must continue to be the first order of business. In the Bureau of Reclamation, ZERO IN ON SAFETY simply signifies a continuing consciousness, awareness, and commitment to safety in every undertaking and at every level of management. In other words, if we continue to implement established policies - maintaining the same interest and dedication that we have in the past - we will continue to enjoy an exemplary safety record.

\* \* \* \* \*

# T H E R E C O R D

## GOVERNMENT FORCES



The following accident statistical tabulations indicate areas of strength and weakness and should be helpful in directing our efforts to specific locations, operations, and phases of accident prevention requiring improvement.

## WORK ACTIVITY - BUREAU-WIDE

<u>Type of work</u>	<u>Man-hour exposure</u>	<u>Disabling injuries</u>	<u>Days lost</u>	<u>Frequency rate</u>	<u>Severity rate</u>
Administration	7, 535, 983	1	31	0.1	4
Construction	2, 717, 832	8	6, 170	2.9	2, 270
Investigation	1, 700, 940	1	23	0.6	14
Irrigation O&M	1, 955, 140	6	156	3.1	80
Power O&M	<u>3, 872, 051</u>	<u>15</u>	<u>273</u>	<u>3.9</u>	<u>71</u>
1971 Totals	17, 781, 946	31	6, 653	1.7	374
1970 Totals	18, 719, 041	34	11, 599	1.8	620

## ORGANIZATIONAL UNIT

### Washington Office

<u>Year</u>	<u>Man-hour exposure</u>	<u>Disabling injuries</u>	<u>Days lost</u>	<u>Frequency rate</u>	<u>Severity rate</u>
1971 Totals	522, 924	0	0	0.0	0
1970 Totals	599, 956	0	0	0.0	0

### E&R Center - Denver

1971 Totals	2, 528, 334	1	31	0.4	12
1970 Totals	2, 588, 424	0	0	0.0	0

### Region 1

<u>Major activity</u>	<u>Man-hour exposure</u>	<u>Disabling injuries</u>	<u>Days lost</u>	<u>Frequency rate</u>	<u>Severity rate</u>
Administration	582, 116	0	0	0.0	0
Construction	583, 210	3	6, 065	5.1	10, 400
Investigation	309, 329	0	0	0.0	0
Irrigation O&M	304, 844	1	55	3.3	180
Power O&M	<u>756, 096</u>	<u>1</u>	<u>26</u>	<u>1.3</u>	<u>34</u>
1971 Totals	2, 535, 595	5	6, 146	2.0	2, 424
1970 Totals	2, 628, 618	5	4, 815	1.9	1, 832

### Region 2

<u>Major activity</u>	<u>Man-hour exposure</u>	<u>Disabling injuries</u>	<u>Days lost</u>	<u>Frequency rate</u>	<u>Severity rate</u>
Administration	1, 118, 675	0	0	0.0	0
Construction	628, 824	1	11	1.6	17
Investigation	295, 581	1	23	3.4	78
Irrigation O&M	603, 350	2	25	3.3	41
Power O&M	<u>620, 053</u>	<u>1</u>	<u>21</u>	<u>1.6</u>	<u>34</u>
1971 Totals	3, 266, 483	5	80	1.5	24
1970 Totals	3, 551, 870	7	120	2.0	34

### Region 3

Administration	658, 870	0	0	0.0	0
Construction	428, 039	3	92	7.0	215
Investigation	197, 398	0	0	0.0	0
Irrigation O&M	115, 200	0	0	0.0	0
Power O&M	<u>829, 853</u>	<u>4</u>	<u>60</u>	<u>4.8</u>	<u>72</u>
1971 Totals	2, 229, 360	7	152	3.1	68
1970 Totals	2, 517, 354	4	212	1.6	84

### Region 4

Administration	633, 024	0	0	0.0	0
Construction	266, 971	0	0	0.0	0
Investigation	285, 581	0	0	0.0	0
Irrigation O&M	37, 188	1	60	26.9	1, 613
Power O&M	<u>444, 100</u>	<u>7</u>	<u>146</u>	<u>15.8</u>	<u>329</u>
1971 Totals	1, 666, 864	8	206	4.8	124
1970 Totals	1, 698, 695	2	7	1.2	4



Region 5

<u>Major activity</u>	<u>Man-hour exposure</u>	<u>Disabling injuries</u>	<u>Days lost</u>	<u>Frequency rate</u>	<u>Severity rate</u>
Administration	375,708	0	0	0.0	0
Construction	222,832	0	0	0.0	0
Investigation	175,458	0	0	0.0	0
Irrigation O&M	665,292	2	16	3.0	24
Power O&M	<u>66,769</u>	<u>0</u>	<u>0</u>	<u>0.0</u>	<u>0</u>
1971 Totals	1,506,059	2	16	1.3	11
1970 Totals	1,571,354	4	167	2.5	106

Region 6

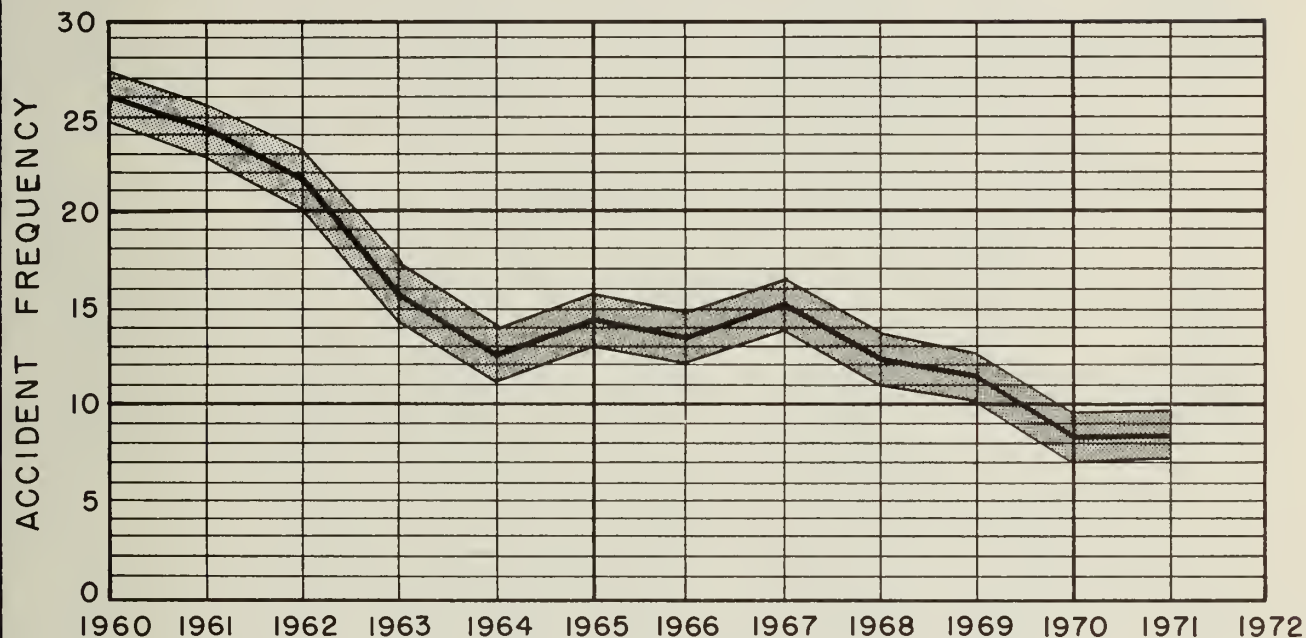
Administration	515,616	0	0	0.0	0
Construction	275,221	0	0	0.0	0
Investigation	243,033	0	0	0.0	0
Irrigation O&M	123,994	0	0	0.0	0
Power O&M	<u>564,987</u>	<u>0</u>	<u>0</u>	<u>0.0</u>	<u>0</u>
1971 Totals	1,722,851	0	0	0.0	0
1970 Totals	1,748,474	4	83	2.3	47

Region 7

Administration	600,716	0	0	0.0	0
Construction	312,735	1	2	3.2	6
Investigation	194,560	0	0	0.0	0
Irrigation O&M	105,272	0	0	0.0	0
Power O&M	<u>590,193</u>	<u>2</u>	<u>20</u>	<u>3.4</u>	<u>34</u>
1971 Totals	1,803,476	3	22	1.7	12
1970 Totals	1,814,296	8	6,195	4.4	3,415

\* \* \* \* \*

# CONTRACTOR FORCES



## WORK ACTIVITY - CONTRACTOR FORCES

Type of work	Man-hour exposure	Disabling injuries	Days lost	Frequency rate	Severity rate
Canals	1, 365, 740	13	292	9.5	214
Concrete dams	2, 472, 137	5	407	2.0	165
Earth dams	872, 142	11	154	12.6	177
Tunnels	1, 192, 973	19	559	15.9	469
*Power facilities	145, 429	0	0	0.0	0
Miscellaneous	731, 619	9	187	12.3	256
1971 Totals	6, 780, 040	57	1, 599	8.4	236
1970 Totals	5, 645, 066	47	9, 363	8.3	1, 659

\* Covers transmission lines and substations.

## ORGANIZATIONAL UNIT

### Region 1

<u>Major activity</u>	<u>Man-hour exposure</u>	<u>Disabling injuries</u>	<u>Days lost</u>	<u>Frequency rate</u>	<u>Severity rate</u>
Canals	125,588	1	60	8.0	478
Concrete dams	2,430,783	3	394	1.2	162
Earth dams	3,509	0	0	0.0	0
Tunnels	181,925	1	9	5.5	49
Power facilities	51,127	0	0	0.0	0
Miscellaneous	<u>22,746</u>	<u>2</u>	<u>103</u>	<u>87.9</u>	<u>4,528</u>
1971 Totals	2,815,678	7	566	2.5	201
1970 Totals	1,827,049	5	2,431	2.7	1,331

### Region 2

Canals	751,891	4	61	5.3	81
Concrete dams	3,896	2	13	513.3	3,337
Tunnels	49,115	1	90	20.4	1,832
Miscellaneous	<u>214,758</u>	<u>2</u>	<u>13</u>	<u>9.3</u>	<u>61</u>
1971 Totals	1,019,660	9	177	8.8	174
1970 Totals	719,714	7	184	9.7	256

### Region 3

Canals	21,818	0	0	0.0	0
Tunnels	16,840	0	0	0.0	0
Power facilities	14,478	0	0	0.0	0
Miscellaneous	<u>249,971</u>	<u>3</u>	<u>45</u>	<u>12.0</u>	<u>180</u>
1971 Totals	303,107	3	45	9.9	148
1970 Totals	681,414	8	231	11.7	339

Region 4

<u>Major activity</u>	<u>Man-hour exposure</u>	<u>Disabling injuries</u>	<u>Days lost</u>	<u>Frequency rate</u>	<u>Severity rate</u>
Canals	8,195	0	0	0.0	0
Concrete dams	37,458	0	0	0.0	0
Earth dams	266,597	1	20	3.8	75
Tunnels	167,037	0	0	0.0	0
Power facilities	3,883	0	0	0.0	0
Miscellaneous	<u>51,739</u>	<u>1</u>	<u>6</u>	<u>19.3</u>	<u>116</u>
1971 Totals	534,909	2	26	3.7	49
1970 Totals	595,319	4	76	6.7	128

Region 5

Canals	99,766	4	41	40.1	411
Earth dams	139,180	5	56	35.9	402
Tunnels	95,431	5	233	52.4	2,442
Miscellaneous	<u>38,727</u>	<u>-</u>	<u>0</u>	<u>0.0</u>	<u>0</u>
1971 Totals	373,104	14	330	37.5	884
1970 Totals	619,323	5	151	8.1	244

Region 6

Canals	318,030	4	130	12.6	409
Power facilities	49,548	0	0	0.0	0
Miscellaneous	<u>34,651</u>	<u>0</u>	<u>0</u>	<u>0.0</u>	<u>0</u>
1971 Totals	402,229	4	130	9.9	323
1970 Totals	486,835	6	6,053	12.3	12,433

Region 7

Canals	40,452	0	0	0.0	0
Earth dams	462,856	5	78	10.8	169
Tunnels	682,625	12	227	17.6	333
Power facilities	26,393	0	0	0.0	0
Miscellaneous	<u>119,027</u>	<u>1</u>	<u>20</u>	<u>8.4</u>	<u>168</u>
1971 Totals	1,331,353	18	325	13.5	244
1970 Totals	715,412	12	237	16.8	331

\* \* \* \* \*



# RECLAMATION JOB CORPS CIVILIAN CONSERVATION CENTERS

## 1971 CUMULATIVE ACCIDENT RECORD

<u>Region</u>	<u>Man-hour exposure</u>	<u>Disabling injuries</u>	<u>Days lost</u>	<u>Frequency rate</u>	<u>Severity rate</u>
Region 1	2,638,944	2	21	0.8	8
Region 4	<u>2,365,602</u>	<u>1</u>	<u>21</u>	<u>0.4</u>	<u>9</u>
1971 Totals	5,004,546	3	42	0.6	8
1970 Totals	4,709,937	2	41	0.4	9

## VEHICLE ACCIDENT EXPERIENCE

<u>Region</u>	<u>No. of accidents</u>	<u>Mileage</u>	<u>Accident rate</u>	<u>Estimated damage</u>	
				<u>Government</u>	<u>Private</u>
Region 1	20	541,852	36.9	\$4,713	\$2,348
Region 4	<u>5</u>	<u>379,121</u>	<u>13.2</u>	<u>825</u>	<u>480</u>
1971 Totals	25	920,973	27.1	\$5,538	\$2,828
1970 Totals	15	918,551	16.3	\$1,890	\$2,911

Vehicle accidents involving Job Corps staff: 9  
 Vehicle accidents involving VISTA workers: 0  
 Vehicle accidents involving corpsmen: 16

THE JOB CORPS CIVILIAN CONSERVATION CENTER -  
 COLLBRAN, COLORADO  
 ESTABLISHED EXEMPLARY SAFETY RECORDS DURING  
 1970 and 1971 BY COMPLETING THE YEARS WITHOUT A  
 SINGLE DISABLING INJURY

DEPARTMENT OF THE INTERIOR  
SAFETY COUNCIL AWARD OF MERIT



Mr. P. Kirt Carpenter (above, left), Weber Basin Job Corps Center Director, accepting Department of the Interior's Award of Merit from Acting Regional Director R. W. Gilbert. The Department Safety Council presented the award to Mr. Carpenter for outstanding safety services while Director of Collbran Job Corps Center. Photo PX-D-70962.

Mr. Jerry M. Kovis, Center Director, Marsing, Idaho, and Mr. Benjamin Pease, Center Director, Columbia Basin Civilian Conservation Center at Moses Lake, Washington, were also presented with the Department of the Interior Safety Council Award of Merit during 1971 for their outstanding safety services.

\* \* \* \* \*

# VEHICLE ACCIDENTS

THE FOLLOWING TABLE SHOWS BUREAU VEHICLE  
ACCIDENT EXPERIENCE SINCE 1962:

<u>Year</u>	<u>No. of accidents</u>	<u>Accident rate*</u>	<u>Estimated damage</u>
1971	104	3.3	\$37,631
1970	85	2.6	26,494
1969	102	3.1	24,388
1968	97	2.6	13,313
1967	117	3.1	32,582
1966	125	3.1	26,771
1965	116	2.9	23,205
1964	114	2.8	36,410
1963	134	3.4	25,130
1962	125	3.4	33,100

\* Number of accidents per million miles driven.

THE FOLLOWING TABLE COMPARES THE VEHICLE ACCIDENT  
EXPERIENCE OF MAJOR ORGANIZATIONAL UNITS  
OF RECLAMATION FOR CALENDAR YEAR 1971

<u>Region</u>	<u>No. of accidents</u>	<u>Mileage</u>	<u>Accident rate*</u>	<u>Estimated damage</u>
Washington Office	0	90,000	0.0	0
E&R Center, Denver	4	403,141	9.9	\$ 143
Region 1	23	3,362,719	6.8	5,811
Region 2	18	7,112,862	2.5	15,136
Region 3	18	4,101,327	4.4	5,442
Region 4	7	3,564,782	2.0	1,966
Region 5	10	4,728,655	2.1	2,235
Region 6	12	4,505,816	2.7	2,593
Region 7	12	4,107,830	2.9	4,305
1971 Totals	104	31,977,132	3.3	\$37,631
1970 Totals	85	32,794,908	2.6	\$26,494

\* Number of accidents per million miles driven.

Note: Estimated damage covers only the cost of repair or replacement of the Government vehicle involved. It is estimated that over \$7,000 of the \$37,631 estimated damage in 1971 will be recovered by the Government.

\* \* \* \* \*

# ACCIDENT COSTS

Accidents do not always involve personal injury to employees but may result in the destruction or loss of property and third-party claims. Consideration and review of costs resulting from accidents is essential to the appraisal of any accident prevention program. The following summary of estimated accident costs for calendar years 1971, 1970, 1969, and 1968 is presented for this purpose.

<u>Type of accident</u>	<u>Estimated Cost</u>			
	<u>1971</u>	<u>1970</u>	<u>1969</u>	<u>1968</u>
Work injuries <u>1/</u>				
Disabling injuries	\$ 36,180	\$ 36,168	\$ 39,480	\$ 29,463
Nondisabling injuries	22,740	25,740	26,580	8,320
Fatal injuries	97,484	82,512	153,388	69,931
Fires	1,590	0	30,700	350
Tort claims <u>2/</u>	33,822	166,152	22,123	186,727
Employee claims	149	328	423	12
Motor vehicle accidents	37,631	26,494	24,388	13,313
Other property damage	<u>26,944</u>	<u>29,099</u>	<u>122,066</u>	<u>20,410</u>
Totals	\$256,540	\$366,493	\$419,148	\$328,526

1/ Cost estimate based on past 5-year average cost.

2/ Tort claims resulting from accidents adjudicated during 1968, 1969, 1970, and 1971. The amount shown for 1968 was reduced from \$361,727 to \$186,727 due to a cross-claim decided during 1970 in favor of the Government.

The costs shown are estimated direct costs resulting from accidents.

STUDIES CONDUCTED BY COMPETENT AND  
RECOGNIZED AUTHORITIES INDICATE THAT  
INDIRECT ACCIDENT COSTS EXCEED DIRECT  
ACCIDENT COSTS BY A RATIO OF 4:1

\* \* \* \* \*



# PUBLIC SAFETY

## RECORD OF PUBLIC DROWNINGS

<u>Bureau-operated Facilities:</u>	<u>CY71</u>	<u>CY70</u>	<u>CY69</u>
Dams	1	0	2
Canals	26	24	27
Reservoirs	1	1	2
Total	<u>28</u>	<u>25</u>	<u>31</u>

### Facilities Operated by Others:

Irrigation and Water Districts	27	38	34
State or County (Recreational)	45	55	35
Total	<u>72</u>	<u>93</u>	<u>69</u>

### Summary of Total Drownings

#### During Period:

#### By Operating Agency:

Bureau of Reclamation	28	25	31
Irrigation and Water Districts	27	38	34
State or County (Recreational)	45	55	35
Total	<u>100</u>	<u>118</u>	<u>100</u>

#### By Type of Facility:

Dams	1	0	4
Canals	52	56	56
Reservoirs	47	62	40
Total	<u>100</u>	<u>118</u>	<u>100</u>

#### By Activity:

Swimming	35	43	28
Boating	9	16	16
Fishing	7	6	6
Fell into water	26	16	18
Other	23	37	32
Total	<u>100</u>	<u>118</u>	<u>100</u>

#### By Age:

Under 12 years of age	18	18	16
From 12 to 25	51	59	39
From 25 to 50	18	21	26
Over 50 years of age	13	20	19
Total	<u>100</u>	<u>118</u>	<u>100</u>

\* \* \* \* \*

# **SAFETY AWARDS**

## **COMMISSIONER'S ANNUAL SAFETY AWARD - 1971**

Presented to Region 6, Billings, Montana, in recognition of the best safety record for Government forces during calendar year 1971.

In winning the Commissioner's Annual Safety Award, Region 6 employees worked 1,722,851 man-hours without experiencing a single disabling injury. This is the first time in Reclamation history that a region has completed a year's work without a single disabling injury.

## **NATIONAL SAFETY COUNCIL AWARDS**

### **AWARD OF HONOR (1970)**

Region 3 - Boulder City, Nevada

Region 4 - Salt Lake City, Utah

### **AWARD OF MERIT (1970)**

Bureau of Reclamation - Bureau-wide

Region 2 - Sacramento, California

Region 5 - Amarillo, Texas

Region 6 - Billings, Montana

## **NATIONAL FLEET SAFETY CONTEST (1970)**

Region 4, Salt Lake City, Utah - First Place (PERFECT RECORD) - Passenger Car Division, Western Region Groups, Group 1.

Region 2, Sacramento, California - Third Place - Passenger Car Division, Western Region Groups, Group 1.

Mr. R. J. Searle (below, right), Regional Safety Officer, Salt Lake City, Utah, accepting from National Safety Council representative on behalf of Region 4 employees the National Fleet Safety Contest Passenger Car Division First Place Award, complete with perfect record seal and certificate of achievement seal. Region 4 employees drove 1,159,096 passenger vehicle miles in 1970 without a reportable accident to win the award over 38 other fleet contestants. Photo PX-D-70964



THE DEPARTMENT OF THE INTERIOR'S  
CERTIFICATE OF SAFETY ACHIEVEMENT AWARD - 1971

IN RECOGNITION OF OVER 2,000,000 MAN-HOURS WORKED  
WITHOUT A DISABLING INJURY:

Collbran Job Corps Civilian Conservation Center - Collbran,  
Colorado  
Marsing Job Corps Civilian Conservation Center - Marsing,  
Idaho

IN RECOGNITION OF OVER 1,500,000 MAN-HOURS WORKED  
WITHOUT A DISABLING INJURY:

San Luis Unit CVP Construction Office - Los Banos, California

IN RECOGNITION OF OVER 1,000,000 MAN-HOURS WORKED  
WITHOUT A DISABLING INJURY:

Region 3 Regional Office - Boulder City, Nevada  
Rio Grande Project - El Paso, Texas  
Weber Basin Job Corps Civilian Conservation Center - Ogden,  
Utah

IN RECOGNITION OF OVER 500,000 MAN-HOURS WORKED  
WITHOUT A DISABLING INJURY:

Las Cruces Irrigation Field Branch, Rio Grande Project -  
El Paso, Texas

IN RECOGNITION OF OVER 1,000,000 ACCIDENT-FREE MILES:

San Juan-Chama Project - Chama, New Mexico  
Ysleta Irrigation Field Branch, Rio Grande Project - El Paso,  
Texas

IN RECOGNITION OF OVER 500,000 ACCIDENT-FREE MILES:

Auburn-Folsom South Unit CVP Construction Office - Auburn,  
California  
Flaming Gorge Field Division - Dutch John, Utah  
Fort Thompson Field Section - Fort Thompson, South Dakota  
Fresno CVP Construction Office - Fresno, California  
Montrose Construction Field Division - Montrose, Colorado  
Navajo Indian Irrigation Project - Farmington, New Mexico  
Oklahoma City Development Office - Oklahoma City, Oklahoma  
Region 3 Regional Office - Boulder City, Nevada  
Sioux City Field Section (Lines) - Hinton, Iowa



## REGION 3 REGIONAL OFFICE RECEIVES DUAL SAFETY AWARDS

Two Department of the Interior Certificates of Safety Achievement Awards for the Region 3 Regional Office were transmitted on behalf of the Secretary of the Interior by Deputy Assistant Secretary for Management and Budget Richard R. Hite, to Commissioner Ellis L. Armstrong. Mr. Hite extended the personal compliments of the Secretary to the Regional Office personnel. Commissioner Armstrong, in turn, indicated that the Bureau was proud of the safety records achieved by the employees of the Region 3 Regional Office, Boulder City, Nevada and extended his congratulations and best wishes for the continued success of their safety program.

One award was for the accomplishment of completing a total of 1,123,620 man-hours without a disabling injury and the other award was for attaining a total of 555,011 vehicle miles without a reportable motor vehicle accident.



Shown above is Regional Director E. A. Lundberg (center) accepting the awards on behalf of the Region 3 Regional Office employees. Regional Safety Engineer Fred J. Lasko is congratulating Mr. Lundberg with Assistant Regional Director Francis M. Warnick (right) looking on. Photo PX-D-70965

## CONSTRUCTION SAFETY AWARD - 1971

The Construction Safety Award is presented to contractors in recognition of exemplary safety records achieved while performing work for Reclamation. To be eligible, a contractor must have initiated and carried out an effective safety program during the term of his contract. He must have achieved a cumulative accident record lower than the average record obtained by all Bureau contractors during the preceding 3-year period. Equally important, he must have indicated a sincere interest in the safety of his employees by virtue of expending the time and effort necessary to carry out an aggressive and continuing safety effort. The following Bureau contractors earned Construction Safety Awards during 1971:

A & K Construction Company, joint venture, and Associates -  
Montebello, California  
Accu-Namics, Inc. - Dallas, Texas  
Asteroid Corporation - San Diego, California  
Bechtel Corporation, Vernon Branch - Los Angeles, California  
Bushman Construction Company - St. Joseph, Missouri  
C. R. Fedrick, Inc., and M. M. Sundt Construction Company -  
Novato, California  
Dan Hayes, Contractor - Farmington, New Mexico  
Dravo Corporation - Burlingame, California  
Electrical Builders, Inc. - Valley City, North Dakota  
Gibbons & Reed Company, Jelco, Inc., and Clyde W. Wood & Sons,  
Inc. - Salt Lake City, Utah  
Gordon H. Ball, Inc. - Denver, Colorado  
H. E. Whitlock, Inc. - Pueblo, Colorado  
Harmon and Associates dba Riverside Construction Company -  
Riverside, California  
Heide-Christolear, Inc. - Smith Center, Kansas  
Huntington Brothers - Napa, California  
Industrial Electric Company - Casper, Wyoming  
Interstate Electric Company - Salt Lake City, Utah  
Jelco Incorporated - Salt Lake City, Utah  
L. R. Yegge Company - Los Gatos, California  
Morrison-Knudsen Company, Inc. - Boise, Idaho  
Oscar C. Holmes, Inc. and Holmes-Clair, Inc. - Menlo Park,  
California  
Pinello-Hefner Construction Company - Colorado Springs, Colorado  
Tidmarsh Engineering Company, Tucson, Arizona  
United Power, Contractors and Engineers, Inc. - Seattle,  
Washington  
W. W. Clyde and Company - Springville, Utah  
Wasatch Electric Company - Salt Lake City, Utah  
Ziebarth and Alper - Torrance, California

CONSTRUCTION SAFETY AWARDS PRESENTED TO ELECTRICAL BUILDERS, INC., AND TO UNITED POWER, CONTRACTORS AND ENGINEERS, INC.



Project Manager Theodore E. Mann, Missouri-Souris Projects Office, Bismarck, North Dakota, is shown above (center) after the presentation of two Construction Safety Awards to Electrical Builders, Inc., and three Construction Safety Awards to United Power, Contractors and Engineers, Inc., for completion of all five contracts with zero accident frequency records. Mr. George Hilstad (second from right), Electrical Builders, accepted awards for Stage 04 Additions to Valley City Substation and for Stage 05 Additions to Fargo Substation. Mr. John Muelenaere (second from left), United Power, accepted awards for Killdeer Substation, Stage 01, for Stage 02 Additions to Summit Substation, and for Stage 02 Additions to Forman Substation. On the left is Mr. John W. Larson, Reclamation's Resident Engineer, Garrison Construction Field Branch, and on the right is Mr. Arthur J. Olien, Resident Engineer, Oakes Construction Field Branch. (Photo PX-D-70966)





Mr. W. E. Naumann, Chairman of the Board, M. M. Sundt-Tidmarsh Engineering Company, is shown above holding a Bureau of Reclamation Construction Safety Award. With Mr. Naumann is Mr. Lawrence S. King, Jr. (left), Project Engineer, Lower Colorado River Project, Blythe, California, and Mr. Fred J. Lasko (right), Regional Safety Engineer, Region 3. The Construction Safety Award was signed by Mr. B. P. Bellport, the Contracting Officer and the Bureau's Director of Design and Construction, by Mr. Edward A. Lundberg, Regional Director for the Bureau's Region 3, and by Mr. Lawrence S. King, Jr. The Lower Cibola Bridge, shown in the background, was completed by the contractor without experiencing a single disabling injury during 16,926 man-hours worked. Bureau of Reclamation Photo P423-306-7716 I Cibola Division - Lower Colorado River Project - Colorado River Front Work and Levee System, Arizona.



PINELLO-HEFNER CONSTRUCTION COMPANY MERITS  
CONSTRUCTION SAFETY AWARD



Mr. Ben Pinello, representing Pinello-Hefner Construction Company, is shown above holding the award presented by Mr. H. E. McInnis (above, right), the Bureau of Reclamation's Construction Engineer at Salida, Colorado. Also pictured, left to right, are Engineers Lee Queen and Bill Pierson and Safety Engineer John Brady. The award was merited by the construction company for its exemplary safety record during relocation of County Roads 9 and 9A around Turquoise Lake near Leadville, Colorado. During the construction of the road relocation, Pinello-Hefner Construction Company fulfilled the criteria and achieved a commendable safety record of 35,775 man-hours of work without a disabling injury. This is a commendable accomplishment and one which has benefited the construction company, its employees, and the Bureau of Reclamation. Photo PX-D-70967.

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# SAFETY PERFORMANCE RECORD

## CUMULATIVE QUARTERLY REPORT

### GOVERNMENT FORCES

Fourth QUARTER, 1971

PERIOD FROM JANUARY 1, 1971 THROUGH December 31, 1971

REPORTING OFFICE	NUMBER OF EMPLOYEES	MAN HOURS	DISABLING INJURIES		OAYS LOST	FREQUENCY RATE	SEVERITY RATE
			CUMULATIVE THIS YEAR	CUMULATIVE THIS YEAR			
Washington Office	251	522,924					
Denver Office - E&R Center	1,224	2,528,334	1		31	0.4	12
REGION 1							
Boise Regional Office	182	328,999					
Central Snake Project	40	72,064					
Chief Joseph Dam	25	52,420	1	1	26	13.9	361
Columbia Basin Project	236	483,928			6,000	12.1	114,460
Grand Coulee Dam Operations	294	630,232					
Green Springs Powerplant	2	4,086					
Hungry Horse Project	40	74,356					
Lower Columbia Planning Office	37	74,578					
Minidoka Project	68	142,880	1		55	7.0	385
Snake River Planning Office	38	80,346					
Teton Basin Project	19	20,465					
Third Powerplant Construction Office	227	428,536	2		65	4.6	152
Tualatin Project Office	16	22,614					
Upper Columbia Planning Office	35	68,170					
Yakima Project Office	30	53,741					
Totals & Averages	1,288	2,535,595	5	1	6,146	2.0	2,424
REGION 2							
Sacramento Regional Office	481	1,101,425					
Regional Drill Crew	22	48,763	1		23	20.5	472
Cachuma Operations Field Branch	2	5,016					
Central Coast Dev. Field Branch	3	6,744					
Folsom Field Division	73	156,880					
Fresno CVP Construction Office	146	265,407	1		11	3.8	41
Fresno Field Division	133	275,552	1		5	3.6	18
Klamath Project Office	16	32,378					
Lahontan Basin Projects Office	20	42,378					
Sacramento Valley CVP Constr. Office	71	156,204					
San Luis Unit CVP Construction Office	38	96,013					
Shasta Field Division	136	283,341	1		21	3.5	74
Solano Operations Field Branch	2	4,016					
Tracy Field Division	156	332,201	1		20	3.0	60
Auburn-Folsom South Unit CVP Construction Office	218	460,215					
Totals & Averages	1,517	3,266,483	5		80	1.5	24
REGION 3							
Boulder City Regional Office	193	366,580					
Boulder Canyon Project	146	305,651	1		22	3.3	72
Dixie Project Office		4,212					
Lower Colorado River Project	129	314,594	3		92	9.5	292
Parker-Davis Project	316	682,416	3		38	4.4	56
Phoenix Development Office	90	182,080					
Southern California Planning Office	17	35,398					
Southern Nevada Water Project	6	91,869					
Yuma Projects Office	123	246,560					
Totals & Averages	1,020	2,229,360	7		152	3.1	68
REGION 4							
Salt Lake City Regional Office	206	413,461					
Central Utah Projects	185	381,959					
CRSP Power Operations - Montrose	260	514,022	7		146	13.6	284
Gurango Projects Office	40	64,644	1		60	15.5	928
Grand Junction Projects Office	112	221,716					
Jogan Development Office	5	10,440					
Lyman Project Office	10	23,330					
Upper Green River Projects Office	18	37,292					
Totals & Averages	640	1,666,864	8		206	4.8	124
REGION 5							
Amarillo Regional Office	96	190,576					
Albuquerque Development Office	28	62,263					
Austin Development Office	38	80,884					
Loan Program Projects Office	1	2,088					
Middle Rio Grande Project	231	463,690	1		12	2.2	26
Mountain Park Project	43	42,501					
Navajo Project	84	162,241					
Oklahoma City Development Office	17	32,311					
Pecos River Office	16	36,612					
Rio Grande Project	161	359,128	1		4	2.8	11
San Juan-Chama Project	22	66,764					
Totals & Averages	737	1,506,059	2		16	1.3	11
CONSOLIDATED TOTALS							
TOTALS LAST YEAR (19 )							

\*FATALITIES INCLUDED IN TOTAL DISABLING

# SAFETY PERFORMANCE RECORD

CUMULATIVE QUARTERLY REPORT

GOVERNMENT FORCES

Fourth QUARTER, 1971

PERIOD FROM JANUARY 1, 1971-- THROUGH December 31, 1971--

REPORTING OFFICE	NUMBER OF EMPLOYEES	MAN HOURS	DISABLING INJURIES		DAYS LOST	FREQUENCY RATE	SEVERITY RATE
		CUMULATIVE THIS YEAR	CUMULATIVE THIS YEAR	FATAL*	CUMULATIVE THIS YEAR	CUMULATIVE THIS YEAR	CUMULATIVE THIS YEAR
REGION 6							
Billings Regional Office	163	298,400					
Geology and Drill Crews	9	17,076					
Canyon Ferry Project	20	38,006					
Fort Peck Project	43	75,011					
Missouri-Oahe Projects	186	365,920					
Missouri-Souris Projects	336	642,840					
Power System Operations Office	49	104,320					
Riverton Project	5	8,923					
Upper Missouri Projects	61	105,019					
Yellowtail Project Office	32	67,336					
Totals & Averages	904	1,722,851					
REGION 7							
Denver Regional Office	184	375,288					
Fryingpan-Arkansas Project	182	384,856	1		2	2.6	5
Kansas River Projects	90	201,608					
Niobrara-Lower Platte Dev. Office	30	60,552					
North Platte River Projects	222	463,840	2		20	4.3	43
South Platte River Projects	156	317,332					
Totals & Averages	864	1,803,476	3		22	1.7	12



# SAFETY PERFORMANCE RECORD

## CUMULATIVE QUARTERLY REPORT

### CONTRACTOR FORCES

Fourth QUARTER, 1971

PERIOD FROM JANUARY 1, 1971... THROUGH... December 31, 1971...

REPORTING OFFICE	NUMBER OF EMPLOYEES	MAN HOURS	DISABLING INJURIES		DAYS LOST	FREQUENCY RATE	SEVERITY RATE
		CUMULATIVE THIS YEAR	CUMULATIVE THIS YEAR	FATAL #	CUMULATIVE THIS YEAR	CUMULATIVE THIS YEAR	CUMULATIVE THIS YEAR
REGION 1							
Boise Regional Office	4	15,438					
Chief Joseph Dam	21	5,543					
Columbia Basin Project	96	107,823	2		135	18.5	1,252
Grand Coulee Dam Operations		2,642					
Hungry Horse Project		1,599					
Teton Basin Project		722					
Third Powerplant Construction Office	1,345	2,667,404	4		403	1.5	151
Tualatin Project	4	2,787					
Yakima Project	8	11,720	1		28	85.3	2,389
Totals & Averages	1,478	2,815,678	7		566	2.5	201
REGION 2							
Sacramento Regional Office		25,333					
Auburn-Folsom South Unit CVP Construction Office	453	640,585	8		170	12.5	265
Fresno CVP Construction Office	170	224,096					
Fresno Field Division		2,339					
Klamath Project Office		180					
Sacramento Valley CVP Constr. Office	2	48,327	1		7	144.8	145
San Luis Unit CVP Construction Office	39	74,686					
Tracy Field Division		4,114					
Totals & Averages	664	1,019,660	9		177	8.8	174
REGION 3							
Boulder Canyon Project	17	4,741					
Lower Colorado River Project		20,591					
Parker-Davis Project	8	6,765					
Phoenix Development Office		7,055					
Southern Nevada Water Project		232,853	3		45	12.9	193
Yuma Projects Office	18	31,102					
Totals & Averages	43	303,107	3		45	9.9	148
REGION 4							
Salt Lake City Regional Office	13	10,277					
Central Utah Projects	112	434,278	1		6	2.3	14
CRSP Power Operations - Montrose		720					
Grand Junction Projects Office	7	68,015	1		20	14.7	294
Lyman Project		13,424					
Upper Green River Projects		8,195					
Totals & Averages	132	534,909	2		26	3.7	49
REGION 5							
Mountain Park Project	21	8,236					
Navajo Project	144	316,838	14		330	44.2	1,042
Pecos River Office	4	19,196					
San Juan-Chama Project	7	28,834					
Totals & Averages	176	373,104	14		330	37.5	884
REGION 6							
Missouri-Oahe Projects	21	45,153					
Missouri-Souris Projects	122	327,648	4		130	12.2	397
Riverton Project	9	11,768					
Upper Missouri Projects	19	17,660					
Totals & Averages	171	402,229	4		130	9.9	323
REGION 7							
Fryingpan-Arkansas Project	234	1,254,480	18		325	14.3	259
Kansas River Projects	32	46,244					
North Platte River Projects	16	29,605					
South Platte River Projects		1,024					
Totals & Averages	282	1,331,353	18		325	13.5	244
Average number of contractor employees per month 1971: 3,522							
CONSOLIDATED TOTALS							
TOTALS LAST YEAR (1970)	2,858	5,645,066	47	1	9,363	8.3	1,659

\*FATALITIES INCLUDED IN TOTAL DISABLING







**SAFETY**

**IN**



*Depends on You*



# *Reclamation* **SAFETY** **NEWS**

**FIRST QUARTER 1972**



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AT URBANA-CHAMPAIGN



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Front Cover Photo: Project Construction Engineer W. C. Hart, Willows, California, is shown presenting the Bureau of Reclamation Construction Safety Award to Bill Nielson, Project Manager for the joint venture of Gibbons and Reed Co., Jelco, Inc., and Clyde W. Wood and Sons, Inc. The award was presented for the contractor's outstanding safety performance and exemplary safety record of completing 309,740 man-hours with accident frequency and severity rates of 3.2 and 145, respectively. An average of 88 men worked over 2 years to complete on schedule the \$9,139,709 job of constructing the Tehama-Colusa Canal and Fish Facilities, Reach 1. Only one disabling injury was recorded during the life of the contract (also see page 10). Photo P602-200-5978NA

# BUREAU SAFETY PERFORMANCE

## 1972 CUMULATIVE ACCIDENT RECORD

January 1 - March 31, 1972

### A. GOVERNMENT FORCES

<u>Region</u>	<u>Injury index*</u>	<u>Frequency rate</u>	<u>Severity rate</u>	<u>Vehicle accident rate*</u>
Region 1	0.5	4.8	11	2.7
Region 2	0.5	1.3	42	3.7
Region 3	0.0	0.0	0	2.2
Region 4	0.2	2.3	7	5.2
Region 5	0.0	0.0	0	3.0
Region 6	1.2	2.2	54	5.8
Region 7	<u>0.0</u>	<u>0.0</u>	<u>0</u>	<u>7.0</u>
Totals to Date	0.2	1.4	16	4.4

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Totals 1971	6.4	1.7	374	3.3
-------------	-----	-----	-----	-----

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\*Injury index is equal to frequency rate times severity rate divided by 100.  
Vehicle accident rate is the number of accidents per million miles driven.

### B. CONTRACTOR FORCES

<u>Region</u>	<u>Injury index</u>	<u>Frequency rate</u>	<u>Severity rate</u>	<u>Fatal injuries</u>
Region 1	2.4	3.9	61	0
Region 2	5,544.5	19.1	29,029	1
Region 3	1,112.4	86.1	1,292	0
Region 4	27.4	24.7	111	0
Region 5	462.4	44.5	1,039	0
Region 6	34.8	34.1	102	0
Region 7	<u>2.7</u>	<u>9.5</u>	<u>28</u>	<u>0</u>
Totals to Date	842.9	13.8	6,108	1

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Totals 1971	19.8	8.4	236	0
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### C. RECLAMATION CIVILIAN CONSERVATION CENTERS

Frequency rate	0.0
Severity rate	0
Vehicle accident rate	0.0

## LOST TIME ACCIDENT ANALYSIS

Government Forces - 1972  
First Quarter

Cumulative to Date:  
March 31, 1972

### A. ACCIDENT CLASSIFICATION

<u>Description</u>	<u>No.</u>	<u>Days lost</u>
Lifting	3	7
Fall	2	28
Slip or twist	<u>1</u>	<u>33</u>
Totals	6	68

### B. OPERATIONAL SUMMARY

<u>Operation</u>	<u>Man-hours</u>	<u>No. of accidents</u>	<u>Days lost</u>	<u>Frequency rate</u>	<u>Severity rate</u>
Administration, Clerical and Design	1,902,994	1	2	0.5	1
Construction	677,074	1	3	1.5	4
Investigation	400,263	0	0	0.0	0
Power O&M	897,565	2	5	2.2	6
Irrigation O&M	<u>493,148</u>	<u>2</u>	<u>58</u>	<u>4.1</u>	<u>118</u>
Totals	4,371,044	6	68	1.4	16

\* \* \* \* \*

### FATAL ACCIDENT NEAR BUREAU TRANSMISSION LINE

Two State Highway employees were checking clearances between the ground and a 115-kv transmission line at a site for a future haul road. The Highway Department had not contacted the Bureau concerning this work. A nonconducting tape had been pulled into the transmission line without consequence when, for reasons unknown, one of the Highway employees raised a 21-foot aluminum range pole into a phase conductor of the line. The 19-year-old man was killed instantly. The second employee, standing about 2 feet away, received severe electrical burns. A man building a fence about 1/4 mile from the accident stated he heard a loud noise as if a plane had broken the sound barrier. He looked and saw a large flash all the way to the ground. He immediately notified a State employee and an ambulance was dispatched to the scene. Less than an hour after the accident, the local Reclamation office was notified and the line was deenergized. Vertical clearance of Reclamation's line at the accident site was reported to be 28 feet.

\* \* \* \* \*

## COMMISSIONER ARMSTRONG REEMPHASIZES MANAGEMENT'S RESPONSIBILITY FOR ENFORCEMENT OF SAFETY AND HEALTH STANDARDS

Enactment of the Occupational Safety and Health Act of 1970, and the President's Executive Order 11612, entitled "Occupational Safety and Health Program for Federal Employees," places greater responsibility upon Federal agencies for the effective administration and enforcement of safety and health standards. Specifically, the Federal legislation requires that each agency provide safe and healthful places and conditions of employment, consistent with the health and safety standards promulgated by the Secretary of Labor. This applies to all types of activity of this Bureau, construction, O&M, planning, and office work.

Safety should be a way of life, an ever-present attitude toward all our activities and our surroundings. It is significant that compliance with the Federal occupational safety and health standards is now required by law. Under the Act, willful or repeated violation of the standards is considered a civil offense; private employers are subject to fines and/or imprisonment depending upon the seriousness of the violations. Failure to observe and to enforce the standards certainly reflects upon competency of supervisors. Responsibility for safe operations and procedures is part of each supervisor's job. If the investigation of an accident associated with a Bureau activity discloses that a supervisor has permitted a violation of the health and safety standards, he will be subject to appropriate disciplinary action. Our commitment is to administer an effective safety program consistent with the standards promulgated under the Occupational Safety and Health Act, and I expect full and complete support and action.

Under the Act, all Bureau activities and operations are subject to compliance with the following established Federal occupational safety and health standards:

Part 1910 - Occupational Safety and Health Standards, published in the May 29, 1971, Federal Register, Volume 36, Number 105

Department of Labor Safety and Health Regulations for Construction, published in Reclamation's Safety and Health Regulations for Construction, Part I.

In order to cover all Bureau activities adequately and to insure optimum safety, these regulations and the current Bureau health and safety requirements shall be observed and enforced. Should there be a conflict between Bureau requirements and the Federal standards, the more stringent shall apply.



The Chief, Division of Safety, will coordinate the implementation of the standards to Bureau activities and prepare guidelines to be followed in familiarizing Bureau personnel with the new health and safety standards. Regional Directors are responsible for the administration of a safety program for all activities under their jurisdiction to insure compliance with the enforcement of the standards. Regional Directors are to inform all operating office heads of the above policy. All Bureau managers must be aware of their responsibility for familiarizing employees with the standards, and for enforcement of the standards on all work under their direction. Each of the Division Chiefs at the E&R Center are similarly responsible for the enforcement of such provision applicable to the employees under their direct supervision.

We have a definite and continuing commitment to work together toward reducing accidents to our employees, contractor employees, and the public. You have our full support in this endeavor.

\* \* \* \* \*

## FEDERAL INJURY RATE HITS A RECORD LOW

The injury disabling rate of Federal Government civilian employees hit an all-time low in 1971, the Occupational Safety and Health Administration announced recently.

The rate of 6 injuries per million employee hours worked compares with the previous record 6.6 set in 1970. It represents a 22.1 percent reduction in disabling injuries since 1965, when the Federal Government began special emphasis campaigns on occupational safety and health.

The disabling injury rate in the private sector in 1971 was 15.2 per million employee hours worked.

These statistics were released at a Federal safety and health seminar sponsored by the Federal Safety Advisory Council and attended by nearly 300 Federal representatives.

The 15-member Council, chaired by George C. Guenther, Assistant Secretary of Labor for Occupational Safety and Health, advises the Labor Department in assisting Federal agencies to implement program responsibilities required by the Williams-Steiger Occupational Safety and Health Act of 1970 and Presidential Executive Order 11612 of last July.

The legislation and the Executive Order require Federal agencies and departments to set up employee safety and health programs and record and report work-related deaths, injuries and illnesses in a system parallel to that required by the Act of the private sector.

Some 120 agencies employing about 3 million civilians with 5,000 different occupations are involved. Last year this Federal workforce suffered 17,466 disabling injuries. Annual costs for such losses totalled \$118 million for compensation and medical expenses, with property damage estimated at \$250 million to \$500 million annually.

Guenther announced the following departments and agencies have been nominated for the 1971 Presidential Safety Award, tentatively scheduled to be presented in June:

In Group I - agencies with the greatest exposure to hazard - 9 out of 12 eligible were nominated. With improvements ranging from 1.5 to more than 20 percent, they are the U. S. Postal Service, District of Columbia Government, Army, Air Force, General Services Administration, Veterans Administration, Department of Agriculture, Department of Commerce and Department of the Interior.

In Group II, 7 out of 11 eligible agencies were nominated with improvements ranging from 2.2 percent to more than 40 percent, they are the Departments of the Treasury, State, Justice, Transportation, Housing and Urban Development, Atomic Energy Commission, and General Accounting Office.

In Group III, eight eligible agencies were nominated. With varying degrees of improved safety performance, they are: U. S. Tariff Commission, Export-Import Bank, Federal Maritime Commission, Federal Deposit Insurance Corp., Small Business Administration, Federal Home Loan Bank Board, Federal Communication Commission, and Federal Reserve System.

The Council heard subcommittee reports on plans for the annual Federal Safety Conference, possible future national programs and the role of Federal safety chapters in the field.

\* \* \* \* \*

#### RECLAMATION VEHICLE ACCIDENTS

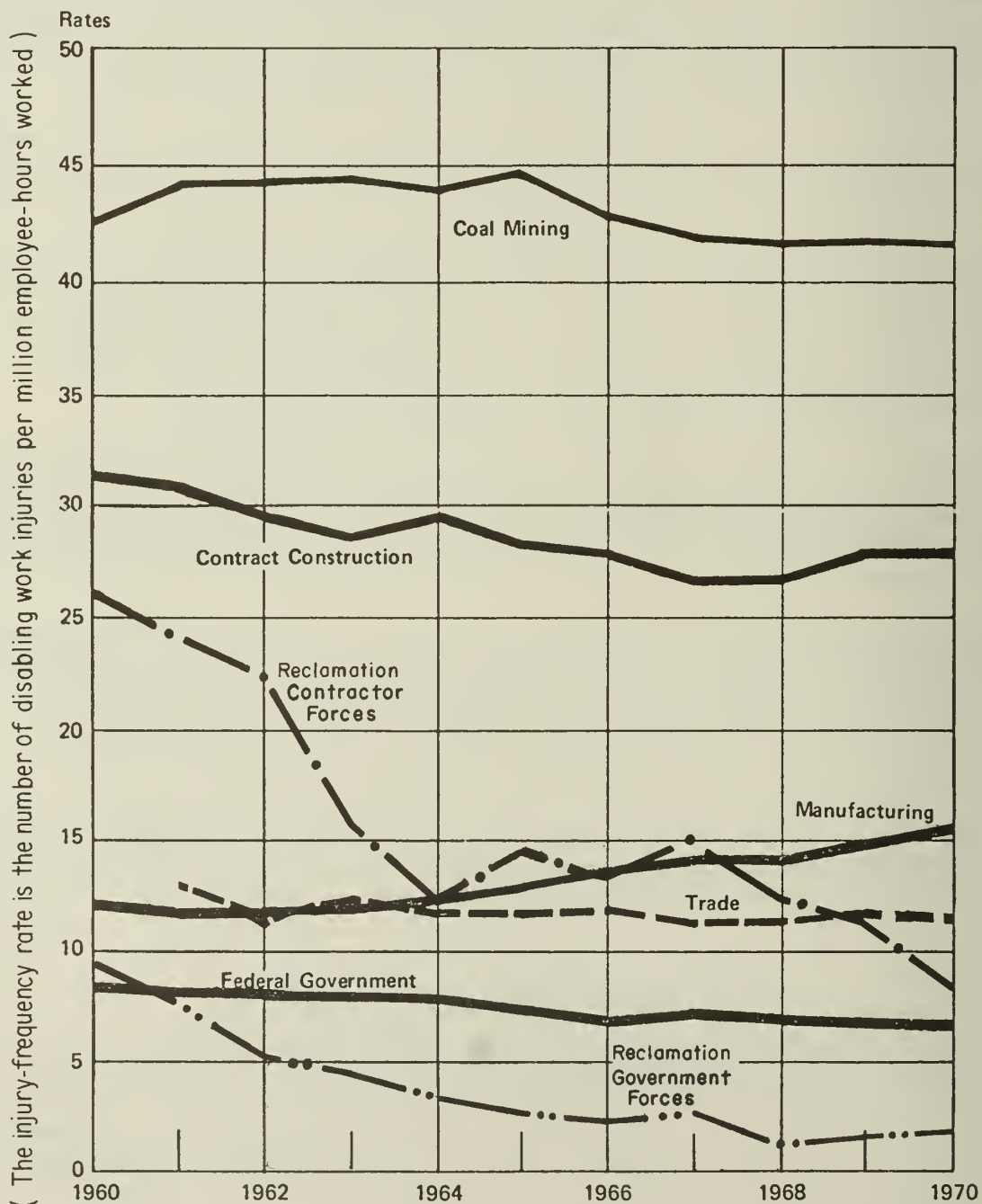
Of the 23 vehicle accidents in which Reclamation employees were involved during the first quarter of 1972, nine (or 39 percent) were the fault of the driver of the other vehicle. Six of the accidents (26 percent) occurred while the Government driver was backing out. Four of the accidents (17 percent) occurred on icy and slippery surfaces, and three (13 percent) occurred when the Bureau driver struck an object in the road (rock, horse, deer).

\* \* \* \* \*

# LABOR DEPARTMENT PRELIMINARY WORK-INJURY RATES FOR SELECTED MAJOR INDUSTRY GROUPS FOR 1970

## WORK INJURY FREQUENCY RATES 1960-1970

Selected Industry Divisions and Groups



U.S. Department of Labor • Bureau of Labor Statistics

# SAFETY AWARDS

## REGION 6 WINS COMMISSIONER'S 1971 SAFETY AWARD

The Commissioner's Annual Safety Award for 1971 was won by the personnel of Region 6 with headquarters in Billings, Montana. They received the award for working 1, 722, 851 man-hours without a single disabling injury. "This is the first time that any region has attained such a record. This is truly a remarkable accomplishment," Commissioner Armstrong said.

Region 6 has been awarded this honor four times since 1961 and demonstrates what can be accomplished when all pull together for a common cause. The award was presented to Regional Director Harold E. Aldrich by the Commissioner at the first session of the annual Skull Practice.

The Commissioner also presented four Department of the Interior Certificates of Safety Achievement Awards. One went to Region 1 Director E. F. Sullivan for the Marsing Job Corps Civilian Conservation Center in Idaho. The corpsmen and staff of the center worked a total of 2, 236, 944 man-hours without a disabling injury during the period August 7, 1969, through July 7, 1971.

The second safety award was presented to Region 4 Director D. L. Crandall for the Flaming Gorge Field Division in Dutch John, Utah. The employees drove a total of 507, 351 vehicle miles without a reportable accident during the period June 21, 1964, through September 25, 1971.

The other two Department safety awards were presented to Region 2 Director R. J. Pafford for the San Luis Unit CVP Construction Office, Los Banos, California, for working 1, 508, 328 man-hours without a disabling injury during the period March 29, 1967, to September 30, 1971, and to the Fresno CVP Construction Office for attaining 525, 749 vehicle miles without a reportable accident.

## NATIONAL SAFETY COUNCIL AWARDS FOR 1971

The Bureau of Reclamation won the National Safety Council's Award of Merit for 1971.

For outstanding safety performance during 1971, the following Regions of the Bureau received the National Safety Council awards indicated as follows:

Region 2 - Sacramento, California .....	Award of Honor
Region 5 - Amarillo, Texas .....	Award of Merit
Region 6 - Billings, Montana .....	Award of Honor
Region 7 - Denver, Colorado .....	Award of Merit



## CONSTRUCTION SAFETY AWARDS

### ASTEROID CORPORATION EARNS CONSTRUCTION SAFETY AWARD

The Construction Safety Award was presented recently to the Asteroid Corporation of San Diego, California. Construction of the Buried Communication Cable, Mead Substation to Hoover Dam, was completed without a single disabling injury. Shown below, left to right, are: Fred J. Lasko, the Bureau's Region 3 Regional Safety Engineer; Michael L. Wegmann of the Asteroid Corporation; and Robert D. Austin, Acting Regional Engineer, Region 3, Boulder City, Nevada. Photo PX-D-71324



DRAVO CORPORATION PRESENTED  
RECLAMATION'S CONSTRUCTION SAFETY AWARD



Reclamation's Construction Engineer H. E. McInnis (above, right) presented the Construction Safety Award to Dravo Corporation, represented by Project Manager James Robertson (holding award). The Bureau's Field Engineer Jack Dill and Safety Engineer John Brady (left) also participated in the award presentation ceremonies at Salida, Colorado, on March 8, 1972. The award was merited by Dravo Corporation for its exemplary safety record during the initial phase of construction of Pueblo Dam with man-hours exposure totaling 599,443. Photo PX-D-71325

The Construction Safety Award is presented to contractors in recognition of exemplary safety records achieved while performing work for Reclamation. To be eligible, a contractor must have initiated and carried out an effective safety program during the term of his construction contract. He must have achieved a cumulative accident record lower than the current 3-year average of all Bureau contractors. Equally important, he must have shown a sincere interest in the safety of his employees, evidenced by the expenditure of time and effort in carrying out an aggressive and continuing safety effort.

RECLAMATION'S CONSTRUCTION SAFETY AWARD  
presented to  
INDUSTRIAL ELECTRIC COMPANY



H. N. "Red" Nickerson, President of Industrial Electric Company, is presented the Construction Safety Award by Construction Engineer J. T. Pyle, Casper, Wyoming, in recognition of the Company's outstanding safety record during construction of 28 miles of the Kortess-Alcova East 115-kv Transmission Line. Photo PX-D-71326



CONSTRUCTION SAFETY AWARD EARNED BY GIBBONS AND REED CO., JELCO INC., AND CLYDE W. WOOD AND SONS, INC. Pictured at the presentation ceremony of the Sacramento Valley Construction Office are (left to right): Bill Vodopich, jobsite Safety Engineer for the joint venture; Dick Mattes, Safety Engineer for Gibbons and Reed at Salt Lake City; W. C. Hart; Bill Nielson; R. W. Cary, Region 2's Regional Safety Officer, and E. S. Ensor, Bureau's Project Safety Officer. Photo P602-200-5977NA. (Also see front cover photo.)

\* \* \* \* \*



ANNUAL BUREAU OF RECLAMATION  
REGIONAL SAFETY ENGINEERS WORKSHOP

The photograph shown below was taken during the annual Bureau Regional Safety Engineers' Workshop at Sacramento, California, January 26-28, 1972.



Standing, left to right: A. V. Ruple, Region 5, Amarillo, Texas; L. M. Hayes, Jr., Region 6, Billings, Montana; G. D. Winans, Region 7, Denver, Colorado; R. W. Cary, Region 2, Sacramento, California; Assistant Regional Director H. E. Horton, Region 2; L. K. Simon, Region 1, Boise, Idaho.

Sitting, left to right: R. J. Searle, Region 4, Salt Lake City, Utah; H. S. Latham, the Bureau's Chief Safety Engineer, Denver, Colorado; F. J. Lasko, Region 3, Boulder City, Nevada.  
Photo PX-D-71329



HEARING CONSERVATION PROGRAM HELD IN DENVER

On March 21 and 22, 1972, Reclamation's Engineering and Research Center in Denver, Colorado, presented a 2-day refresher program on noise control and hearing conservation. The 2-day session, conducted by Tom Logan, General Engineer, Division of Design, and Dr. Darrel Teter, Consulting Audiologist, was attended by Regional Safety Engineers and Bureau sound technicians. The purpose of the program was to resolve technical problems that have developed since the inception of the Bureau's hearing conservation and noise control program in 1968 and to review audiometric testing procedures.

Tom Logan is shown below (right) demonstrating some of the audiometric testing equipment to H. Alma Guerra, Occupational Health Nurse at the Boulder Canyon Project, Fred Lasko, James Bosanko, and John Forman from the Region 3 Regional Office in Boulder City, Nevada. Photo PX-D-71328



\* \* \* \* \*

# WATER SAFETY

## RECORD OF PUBLIC DROWNINGS

January 1, 1972, through March 31, 1972

### Bureau-operated Facilities:

Canals	8
Reservoirs	<u>1</u>
Total	9

### Facilities Operated by Others:

Irrigation and Water Districts	5
State or County (Recreational)	<u>2</u>
Total	7

### Summary of Total Drownings During Period:

By Operating Agency:	
Bureau of Reclamation	9
Irrigation and Water Districts	5
State or County (Recreational)	<u>2</u>
Total	16

By Type of Facility:	
Canals	13
Reservoirs	<u>3</u>
Total	16

By Activity:	
Swimming	2
Boating	1
Fishing	0
Fell into water	2
Other	<u>11</u>
Total	16

By Age:	
Under 12 years of age	2
From 12 to 25	4
From 25 to 50	9
Over 50 years of age	<u>1</u>
Total	16

# Presidential Documents

## Title 3—The President

PROCLAMATION 4105

### National Safe Boating Week, 1972

*By the President of the United States of America*

#### A Proclamation

Boating on our Nation's waterways has become a source of recreational pleasure for a rapidly increasing number of Americans. Increased use means more enjoyment for more people, but it carries with it an increased responsibility as well. Those who use our waterways must take greater care to observe the rules of good seamanship and of boating safety.

To focus national attention on the need for safe boating practices, the Congress, by a joint resolution approved June 4, 1958 (72 Stat. 179), requested the President to proclaim annually the week which includes July 4 as National Safe Boating Week.

NOW, THEREFORE, I, RICHARD NIXON, President of the United States of America, do hereby designate the week beginning July 2, 1972, as National Safe Boating Week.

Many boating tragedies could be avoided through education and common sense. I urge all Americans who use our waterways to take advantage of the numerous boating safety courses offered by governmental and private organizations, such as the United States Coast Guard, the Coast Guard Auxiliary, the United States Power Squadrons, the American Red Cross, and various State agencies.

Last August I signed into law the Federal Boat Safety Act of 1971, designed to improve boating safety and to encourage State participation in boating safety efforts. I invite the Governors of the States, the Commonwealth of Puerto Rico, the Virgin Islands, Guam, and American Samoa, and the Commissioner of the District of Columbia to cooperate in implementing that act, and in providing for the observance of National Safe Boating Week.

IN WITNESS WHEREOF, I have hereunto set my hand this fifth day of February, in the year of our Lord nineteen hundred seventy-two, and of the Independence of the United States of America the one hundred ninety-sixth.



[FR Doc.72-1918 Filed 2-7-72; 11:15 am]

\* \* \* \* \*

# VEHICLE SAFETY

## GRAVEL ROAD DRIVING TECHNIQUES

A high incidence of single-vehicle accidents on gravel roads, at about normal driving speeds, points up the need for special driver education and training in this area.

Most drivers involved in gravel road accidents are not traveling at excessive speeds, but the accidents in almost every case were avoidable.

They were caused by the driver ignoring or being ignorant of the warning signs of a pending loss of control. Typically, the vehicle started off the right side of the road, was steered to the left side, sharply cut back to the right and off the road into the ditch. Once in the ditch, the driver frantically tried to get out and the vehicle rolled.

Once the sequence starts, the pattern is identical. A meeting of a unit's drivers to discuss this sequence will do a great deal of good in preventing this type of accident.

In your discussion there are a few points to consider:

a. The vehicles involved in these accidents are usually pickups, 4 x 4, or power wagons. These vehicles will normally be lighter weight than the average passenger car. This will cause the vehicle to have a greater tendency toward a rear end sway or "dance" on gravel roads.

b. These vehicles are also built with a high center of gravity. The reason is that they are built for field work. Also, they ride high on the springs when there is no load in the bed. Passenger cars are built lower to the ground and, as a result, have far better steering control. When an empty pickup is driven on gravel, the high center of gravity makes the vehicle "oversteer." In other words, when the vehicle is turned it tends to tighten the turn. A passenger car is designed specifically not to have this characteristic. When you couple these two facts together and put a driver behind the wheel who has driven only passenger cars, you can begin to understand how and why a man can be driving on a straight road at high speed and by himself lose control of his vehicle.

A professional truckdriver, one who is familiar with driving different types of equipment, knows these facts. He may not know the reason for it, but he can feel it in the vehicle and automatically make adjustments for the feel. When the rear end begins to sway or "dance" he will ease up gradually on the accelerator and reduce his speed to stop the rear end sway. This is the key to preventing an oversteer pattern



from starting. The second thing he will do is adjust his steering inputs so that he has a "light" touch on the wheel and he will make all steering corrections firmly but gradually.

His steering inputs also will be made more frequently. In other words, on a straight stretch of road he will be making a few more steering inputs than the average driver.

The biggest trap that a gravel road can present is an uneven gravel surface. Frequently you will find more gravel in the center or sides of the road. This will aggravate control of a light truck far more than any other type of vehicle. When conditions such as these exist, speed absolutely must be reduced. The most experienced driver cannot insure that normal vehicle wander will not take him into the excess gravel area. Speeds must be drastically reduced so that the vehicle is controllable if it should enter the heavy gravel. The driver who does not take these steps will find the problem compounds so quickly that no action can be taken to keep the vehicle under control.

We have added 400 pounds of weight to all pickup beds. This may help the control problem slightly. I emphasize the word "slightly." The added weight will not make the pickup drive like a passenger car. The problems inherent to a light truck will still be there and driving habits must still be modified to overcome the steering problems associated with light truck operations. Any excess steering play in the front end is naturally going to aggravate the steering problem. The road and vehicle condition will dictate the speed at which the vehicle must be operated. The driver must continually feel for that speed which will completely stop a rear end sway. It goes without saying that any vehicle not in safe mechanical condition for driving off base must be turned in for maintenance.

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## COMPUTERIZED CAR POOLS

The City of Honolulu is attempting to overcome the rush-hour congestion and pollution problem created by 300,000 cars by setting up the nation's first citywide computerized car pool system. The plan calls for residents to fill out cards saying where they live and where and when they work. The information will be fed into the city's computer system which will match each resident with four others from the same neighborhood with similar work schedules. The five will then be asked to take turns driving to work. Mayor Fasi announced that the program will begin with the carpooling of 7,000 city employees.

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## LOVE THAT SAFETY BELT

There's a budding love affair between car owners and safety seatbelts that all the time and tide of freeway driving cannot divide or erase.

Like all romances, it was slow to spark and grow. But once started, the attachment is now passionate and everlasting. And, like all idealistic things, there's hard-headed clarity to the affair - safety in union.

People increasingly accept the undeniable proof that a buckled-up driver or passenger owns the odds on survival from even the most serious accidents. The latest proof is a study made in California of 113 accidents recorded over two holidays in 1968. Drivers or passengers died in 76 of the vehicles involved. But there were no deaths or serious injuries in all cases where belts were being used.

There's plenty of other data backing up this proof of safety from seatbelts. One national study, described as the most thorough ever undertaken, disclosed that 40 percent of passengers killed in auto accidents would have walked away from the scene if they had buckled-up. Twenty percent of these deaths could have been prevented by the combined shoulder harness and belt.

The Government has long accepted the lifesaving potential in the safety seatbelt, and declared them mandatory in automobiles. Trucks, at one time, were excluded from the Federal order, but the Secretary of the Department of Transportation is reportedly considering this requirement under the Federal Vehicle Safety Standards.

Are you wearing your belt?

\* \* \* \* \*

## NATIONAL CHECK-YOUR-VEHICLE-EMISSIONS MONTH

In his Proclamation proclaiming April 1972 to be National Check-Your-Vehicle-Emissions Month, the President called upon all Americans to recognize the need for curbing exhaust pollutants from their motor vehicles by maintaining them in good working order.

The task of cleansing our environment calls for individual effort on the part of all Americans.

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## JOB SAFETY AND HEALTH AGENCY SETS TIMETABLE FOR CHANGES IN STANDARDS

A timetable for 46 proposed changes in standards affecting the work-place environment was announced today by the Occupational Safety and Health Administration (OSHA). (From News Release dated March 3, 1972.)

George C. Guenther, Assistant Secretary of Labor for Occupational Safety and Health, said "OSHA's job safety and health standards are the keystone of the Williams-Steiger Occupational Safety and Health Act of 1970. They must be dynamic in order to fairly provide for maximum protection in the rapidly changing workplace environment."

The timetable calls for changes in 31 standards by the end of 1972 fiscal year (June 30, 1972) and an additional 15 by the midpoint of fiscal 1973 (December 31, 1972). Two more were announced last month.

Guenther said the changes are key parts of a three-phase program of standards development by the OSHA Office of Standards under Acting Director Gerard F. Scannell.

The first phase involves correction of typographical errors and similar nonsubstantive items found in the initial standards published in 1971.

The second phase clarifies adopted national consensus standards and revoked some provisions because of their discriminatory nature or because they conflict with other parts of the standards.

The third phase involves adopting new standards, developed either by national consensus standards organizations or by the Department under procedures presented by the Williams-Steiger Act.

Guenther said "We are announcing the schedule for these proposed changes so as to inform interested parties of OSHA's intentions. Due to the complex technical nature of many of the standards, the timetable cannot be considered absolute, but reflects our best estimate of what can be accomplished during the balance of 1972."

Among the proposed changes and target dates for completion are the following:

### MARCH

- Revoking the ban on steering knobs on industrial trucks.
- Modifying the grounding requirement for woodworking machinery to permit the use of double insulated tools, and for switch controls on portable power tools.

-- Amending the construction section for roll-over protective structures for vehicles. (Note: See Federal Register, Volume 37, No. 66 - Wednesday, April 5, 1972, pages 6837-6846.)

### APRIL

-- Bringing standards for explosives into line with those of the Department of Transportation (DOT) and the Internal Revenue Service (IRS) to provide a single uniform set of regulations.

-- Modifying flammable liquid container specifications to reflect DOT regulations.

-- Revoking requirements for women's retiring rooms and on the height of toilet partitions.

-- Modifying requirements on drinking water and ice, on the need for split toilet seats, and others.

-- Revoking a section on color code marking of physical hazards and on size requirements for signs.

-- Rectifying conflicts on railings, exit signs and color coding.

-- Making technical changes, largely to assure language conformity, in sections involving machinery and machine guarding, hazardous materials, fire protection, materials handling and storage, welding cutting and brazing, and such special industries as pulp, paper and paperboard mills, textiles, bakery equipment, laundry machinery and operations, pulpwood logging and agricultural operations.

### MAY

-- Making technical changes and corrections in sections affecting powered platforms, manlifts and vehicle-mounted platforms, and compressed gas and compressed air equipment.

-- Adding new sections on protective helmets for electrical workers, slings, uniform traffic control devices, exits, sprinklers, foam, mechanical power transmission guarding, bakery equipment and floating cranes and derricks.

### JUNE

-- Adding new sections on woodworking machinery, oil burning equipment, ovens and furnaces and installation of gas appliances.

-- Adopting the 1971 Threshold Limit Values of the American Congress of Governmental Industrial Hygienists on toxic substances and noise, replacing 1968 and 1970 levels.

-- Promulgating an asbestos standard to replace the emergency standard issued December 7, 1971.

-- Amending the construction standards to correct conflicts, duplications and technical errors, including those on catch platforms and scaffold heights.



- Completing a section on electrical transmission and distribution lines and equipment, including a specific standard for the electrical utility industry.
- Bringing sections of the general industry standards and the construction standards into conformity.

### JULY

- Adding a section on installation of gas piping and gas equipment on industrial premises.
- Bringing maritime standards into conformity with other standards where like hazards are covered.

### AUGUST

- Adding sections on longshoring on the docks, diving operations and workmen's hoists.
- Revoking the ban on pump-jack scaffolding.
- Adding amendments on tunneling to the construction standards.
- Resolving differences on scaffold requirements.

### SEPTEMBER

- Adopting a new standard on bis (chloromethyl) ether.

### OCTOBER

- Adding parts of a new consensus standard on machine guarding for woodworking machinery, and on work in confined spaces.

### DECEMBER

- Adding new sections on dredging and local exhaust systems.
- Promulgating, in coordination with the National Institute for Occupational Safety and Health, standards on two of the OSHA Target Health Hazards: carbon monoxide and silica.

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CONTRACTORS CITED FOR VIOLATIONS OF FEDERAL SAFETY  
AND HEALTH REGULATIONS FOR CONSTRUCTION (SECTION  
1926 OF TITLE 29, CODE OF FEDERAL REGULATIONS)

Beall Construction

Beall Construction Company, Lincoln, Neb., is contesting a citation and proposed penalty of \$31,744.

The penalty proposed was originally \$3,698, but was increased to the new total for failure to abate by the specified date and for alleged violations found at the time of reinspection.

Beall was cited for three alleged serious violations at Fremont, Neb., in a second citation issued at the reinspection. Standards involved were 1926.451(i)(1), 1926.451(a)(1) and (i)(4), and 1926.451(i)(11). The citation alleges a two-point suspension scaffold platform not securely fastened to hangars by U-belts or by other equivalent means, a two-point suspension scaffold was secured and supported with plank supported by concrete blocks; no roof irons or hooks of mild steel or other equivalent material of proper size and design securely installed and anchored was provided as a secondary means of anchorage; and a guard rail on a two point suspension scaffold was less than two feet by four inches or equivalent.

Non-serious violations alleged in the second citation numbered 10 among which were 1926.401(j)(1), 1926.56(a), 1926.150(c)(1)(i), 1926.150(a)(1), and 1926.150(c)(1)(iv). The citation refers to temporary lighting on all floors not provided with guards to prevent accidental contact with bulbs, inadequate lighting, no fire prevention protection developed, 55-gallon drums of water used as substitute for fire extinguisher on each floor were more than 100 feet from some parts of protected areas on all floors, and three 55-gallon drums containing water were frozen.

The original citation issued November 15 was for eight alleged violations including 1518.552(b)(5)(ii), 1518.552(a)(2), 1518.552(b)(2), and 1518.500(d)(1). The citation alleged a hoist tower was not enclosed nor was the platform enclosed, no postings were visible on car or platform, landing entrances were not guarded, and failure to provide a guard rail or intermediate rail at wall openings; in some areas there was wire in use which did not meet the requirements of 1518.500(f)(1). (Docket No. 557).

Steel City

Steel City Erection Company, Inc., Anniston, Ala., was cited February 10 for alleged serious violation of 1926.750(b)(1)(ii). The citation alleges employee (connectors) about 50-feet above ground were without scaffolds, decking, or temporary floors or safety nets to provide protection for them.

Alleged non-serious violations were of 1926.752(a)(1), 1926.501(a), 1926.451(1)(4), 1926.550(a)(14)(i), and 1926.550(a)(6). These standards were cited for bolts, washers, and nuts in kegs and buckets unsecured on floor beams smaller in width than the diameter of the kegs; no ladder (or stairway) to provide access to levels (tiers) above approximately 30 feet; employee on boatswain without lanyard and safety line and belt; no fire extinguisher on crane; and no inspection certificates on crane. The total proposed penalty was \$575 (No. 560).

#### Hare Construction

Hare Construction Company, Inc., Phoenix, was cited February 2 for alleged violations of 1903.2, 1926.100(a), 1926.152(a)(1), and 1926.500(b)(8). The citation alleges failure to post OSHA notice, laborer exposed to overhead hazards working on construction site in and next to building and crane without head protection, gas in can near trailer office not approved safety can, and nine foot deep concrete lined pit, 5x10, top opening to basement utility area without cover or guardrail. The total proposed penalty was \$110 (No. 581).

#### Morrison-Knudsen Company

Morrison-Knudsen Company and Associates, Langdon, N.D., was cited for alleged serious violation of 1518.105(a). The citation alleges safety nets or equivalent was not provided for employees working near the unguarded edge of an access floor opening in excess of 25 feet above ground level in P.A.R. building.

There were 19 alleged non-serious violations in the citation among which were 1518.602(c), 1518.451(e), 1518.500(d), 1518.451(a), and 1518.350(h). The citation refers to a horn on fork lift truck inoperative, casters for three mobile scaffold towers located in limited area sentry station not provided with positive locking devices, phase shifter platforms not provided with standard railings or equivalent protection, unstable wood blocks were used as partial footing for scaffolding, and pressure gauges with broken glass were used for oxygen/acetylene welding equipment located in the garage of the limited area sentry station. The total proposed penalty was \$1,215 (no. 578).

#### Terrell Construction

Terrell Construction Company, Toccoa, Ga., was cited February 3 for alleged serious violation of 1518.900(r) and 1518.906(r). The citation alleges the employer did not provide an electric blasting machine or properly designed electric power source to fire the explosives and the employer allowed blasting under a 7,200 volt electric power line without requiring that the blasting be securely anchored. The total proposed penalty was \$500 (No. 592).

The above citations and/or penalties are being contested.

## SAFETY IN PESTICIDES

By Stewart W. Turner. Mr. Turner is a former faculty member of the University of British Columbia from which he received both undergraduate and graduate degrees. He has conducted research in the application and use of pesticides here and in foreign countries over the past 25 years. He has operated a commercial spraying business and a commercial chemical formulating business and acts as adviser to Lloyds of London and to many State Departments of Agriculture. He is a member of the American Association for the Advancement of Science, the Agricultural Institute of Canada, and the Weed Science Society of America.

In the development of any industry, there comes a time when through carelessness, lack of knowledge, the development of unforeseen conditions, or just plain misuse, injuries occur. Not infrequently, the situation presents good press copy for the media, and crusading editors seize upon the subject matter with a view to increasing the press runs.

Such a situation developed here in the United States a few years ago when, having tired of promoting the development of fall-out shelters, the attentions returned to ecology, environment and pesticides.

To read, in fact to believe, many of the published reports, it would appear that the use and effects of agricultural chemicals were something new that had only taken place within the last year or two whereas, in actual fact, chemicals have been applied for purposes of pest control, disease control, weed control, and as fertilizers for several hundred years.

We are led to believe that because many of the chemicals introduced since World War II possess complex structure and long names and, in certain instances, lengthy residuals, that these are all bad. We have only to look to the period prior to World War II when the majority of our insecticides were based upon arsenic, a lethal poison when taken in adequate dosage, to realize how very great the improvements have been with the use of synthetic compounds.

We have only to look at the control of disease that has been accomplished through the use of some of these newer compounds to appreciate their value.

Let us consider that favorite whipping boy, DDT. While this compound possessed the tongue twisting name of Dichlorodiphenyltrichloroethane, and very probably represented the compound which achieved the greatest total usage throughout the world, misstatements of fact, incorrect reading of analytical procedures in the laboratory, and the desire of the



press to promote anything that is new and sensational resulted in DDT becoming a dirty name, whereas in fact it is undoubtedly one of the greatest benefactors of mankind the world has ever known.

Consider the facts. Sweden, the first country to ban DDT is today using more of this chemical than was ever used in the history of that country. And why has this change taken place? The answer is very simple. The economy of Sweden depends primarily upon wood products. With the banning of DDT, insects had a field day and the well-meaning but misguided authorities suddenly discovered that in effect, through banning DDT, they were saving their forests for the bugs, and the economy of the country was facing a severe downhill slide.

Consider the situation in the Orient. Ceylon banned DDT, and within one year of the ban, cases of malaria jumped from under 5,000 to in excess of 100,000. Since the advent of DDT in the United States, we have not recorded one single case of domestically vectored malaria, whereas prior to the use of this compound some 5,000 individuals a year in the Southern states fell prey to this disease.

But how much publicity has been given to the fact that prior to 1967, laboratories throughout the world were diligently reporting the presence of DDT in everything from soup to nuts and not excluding fish, simply because we did not then possess appropriate techniques for segregating the PCB compounds from DDT. Since the PCB compounds have been around a great many years longer than DDT, and are far more uniformly distributed throughout the globe, the premise was immediately presented as a fact that DDT existed from pole to pole.

We have also been faced with contentions that the use of DDT will result in the ultimate elimination of the peregrine falcon and other species. This is the "thin eggshell theory", and we are advised that such an event would have a very traumatic result on the yet unborn generations of this country.

I wonder what argument was used among the early inhabitants of this earth to preserve the dinosaur? I have never seen a dinosaur and yet I do not believe that I have suffered any traumatic effect as a result. . . quite the contrary, as I am quite certain that if I did observe a viable dinosaur, I would either have to take the pledge or the next plane east.

We are told that DDT is bad because it does not break down and remains forever in the environment. If one would take the trouble to read various issues of the Pesticide Monitoring Journal, one would learn that governmental agencies which have been regularly analyzing soil, air, and water in the United States for a great many years found that the majority of the samples contained no trace of DDT, not even in the Mississippi River and its tributaries.

From my own personal knowledge, being engaged in the troubleshooting end of this business for the past 25 years, I find it a rather ironic situation that we have in DDT what is undoubtedly the safest compound insofar as toxicity to humans is concerned that has ever been invented, and because it is being banned and restricted in many areas, the substitute compounds which must be used in its place if we are to eat regularly consist for the most part of the organic phosphate group of compounds, which are among the most lethal the world has ever known. In all of the thousands and thousands of cases in which I have been involved, only three concerned DDT and none of these three cases involved toxicity. What made up the balance of the thousands of cases? The very compounds that we are now forced to use as substitutes for DDT, because of their greater toxicity hazard and in addition, with many of them, a phytotoxic hazard to certain plant species.

What is the truth of the situation in regards the effect of this compound on birds and specifically on the contention that eggs will not hatch or that shells are too thin to permit survival? Let us take a look at the statement by Rachel Carson in Silent Spring, and I quote, "When DDT was introduced into the diet of Japanese quail, few of the eggs hatched."

Her source of information was cited as "Chronic Toxicity to Quail and Pheasants of Some Chlorinated Insecticides", by J. B. Dewitt, 1956, published in Agriculture and Food Chemistry, 4(10) 853-66. For those who take the trouble to look beyond the comments by Miss Carson and examine the original document upon which she allegedly based her statements, you discover that somewhere in the transition, the truth was lost. Referring to the publication in question on page 865 in table 3, it recites the amount of DDT introduced into the diet was 200 parts per million during the reproduction period. Under the column for "hatch percent", you find that 80% of the eggs laid by quail fed the DDT hatched, as compared with 83.9% of those laid by controls with no DDT. You also note that 92.8% of the eggs from the DDT birds were fertile, compared with only 89% fertility from the eggs of the birds with no DDT. This data, of course, was not mentioned. Nor was the even more interesting data pertaining to the survival rate on pheasants which the researchers found gave a hatch of 80.6% on pheasants fed DDT throughout the entire year, compared with only 57.4% of the non-DDT-fed birds.

And so it goes.

I sometimes wonder if the definition of ecology is the science of measuring the thickness of egg shells in total darkness.

In actual fact, if one examines in detail some of the research data which purportedly resulted in thin-shelled eggs, we find that the techniques used involve incorporation of DDT in the diet fed to birds, but the diet

itself was grossly deficient in calcium. When the experiment was repeated by federal laboratories in the Fish & Wildlife Service, wherein they utilized the same diet but eliminated the DDT, they duplicated the thin eggshells, but when they added a low level of calcium and DDT they found that the shells were almost normal, indicating that DDT may have actually prevented thinning.

Certain researchers in Britain have found that birds on a DDT diet (with all of the other essential minerals and vitamins present in the diet) produced shells that were 7% thicker than normal.

But so much for the birds. . . what of humans?

I have mentioned the great benefits in the control of malaria, not only here but in foreign countries and one must also consider the control of typhus and other diseases vectored by insects which, in the absence of our pesticides, could well bring about another plague in many foreign countries.

In essence, we find that more people are killed in this country each year as a result of ingesting excess aspirin than are killed with pesticides, and for the most part, the majority of those who do die from pesticide poisoning are classified as suicides.

We are told that many of our herbicides are so lethal that they should be permanently banned from the economy.

I cannot help but admit that many of our herbicides do have hazardous characteristics, particularly if they come in contact with vegetation to which they are not intended to be applied. But this is nothing new.

Here in the state of Idaho, your Department of Agriculture recognized the potential hazard of herbicides over 20 years ago, and you should be proud that Idaho was one of the first five states in this country to enact meaningful legislation promulgated by the Legislature, enforced and regulated by the Department of Agriculture, to control the use of herbicides to prevent widespread adverse effects to the properties of others. These compounds can be used and they can be used safely, to the benefit of all concerned. It is my understanding that we have something in the vicinity of 50,000 deaths a year in this country as a result of automobile accidents, but I don't see the ecology types agitating for the prohibition of the use of automobiles. I wonder why? Perhaps they would find horses much too lethal and I'll admit that on occasion they can be.

But I wonder what the automobile situation would be like if meaningful regulations had been developed and enforced within five years of the



introduction of the automobile to society, such as the regulations developed here in Idaho within that same period of time following the introduction of herbicides.

It is very simple to say that one can live without pesticides and that one should return to nature. There are certain advantages in so doing, I will admit, albeit I am afraid one might become just a little hungry, just a little cold, just a little uncomfortable, and just a little short-lived in the process.

We complain about our food bill, but how many of us stop to calculate exactly what our food bill would be in the absence of the use of pesticides here in America? Consider, for example, the price of wheat which has shown a steady decline from 1945 to the present day. I don't have to tell you what has happened to the cost of tractors, equipment, and labor, all of which together with the land are essential in the production of wheat. How, then, can the grower survive? The answer is to be found in the application of science, not only through the use of pesticides and fertilizers but also from the application of genetics and plant breeding. If, as a boy on our ranch, someone had told me that a variety of wheat would under favorable conditions show a yield in excess of 100 bushels per acre, I would not have believed it. And yet, in 1971, there were many growers in the Walla Walla area of Washington who, without the benefit of irrigation, produced in excess of 100 bushels of Gaines wheat per acre.

Much of the safety in relation to pesticides rests upon the user of applicator of the compounds. In this connection, it is interesting to observe the work carried out by the universities and colleges as well as the manufacturers, not only in formulating these compounds so that the end product is in the safest possible form for usage, but also the relationship of the State Department of Agriculture here in Idaho in developing regulations which will permit the use of these compounds with the lowest possible hazard to all concerned.

The airlines are justly proud of their death rate of 0.8% per 100,000 passenger miles. If we were to apply the same criteria but converting the miles to acres, we would find the death rate from the use of pesticides to be one-thousandth of that enjoyed by commercial air travel.

It is axiomatic that the sensational receives the headlines, and often we read of millions of fish killed, hundreds of cattle dead, etc., etc. I personally investigated one of these large fish kills in California a few years ago and arriving on the scene, I found that I could park no closer than one mile away due to the large number of Fish & Game cars that were there before me. Finally making my way into the ditch



in question, I discovered that the millions of fish headlined in the San Francisco newspaper that morning actually amounted to 7. I further discovered that the fish in question were in a drainage ditch that carried excess water from a rice field. Now, it seems to me that if the irrigation system in question had been developed primarily for the production of crops, and if the drainage ditch was a necessary part of that irrigation system, and if it was necessary for the grower to treat that rice field to protect the crop in question from insect destruction, and if in the process the seven fish in the drainage ditch picked up some of the insecticide and expired, was the purpose of the development of that irrigation system the protection of fish trespassing in a drainage ditch, or was it for the protection of the crop? According to the newspapers, the whole system must have been installed solely for the provision of a habitat for the fish. No mention was made of the crop production involved.

Some of you may have read of the loss of cattle in the state of Washington as a result of an insecticide spray applied to the cattle. The facts are true. The cattle were sprayed and many of them died. But what is the background behind the headline? The story is simply this--the owner of the cattle attempted to purchase DDT, as he had been using this compound since its introduction with very great success. Upon being advised that he could no longer spray the cattle with DDT, he then inquired if he could use another insecticide for the control of the livestock pests. Upon being advised that the insecticide of his choice was not registered for use on cattle and could not be sold to him, he proceeded to another dealer where he purchased the material, did not read the label, and sprayed the cattle with Parathion with the well-known results. In another case involving injury to a crop in California, the grower attempted to purchase a certain herbicide to be applied to his cabbage planting. The dealer advised him that the herbicide in question was not legally registered for use on cabbage, whereupon the grower proceeded to another dealer, purchased the herbicide without mentioning its intended use, applied it to the crop and sustained substantial damage as a result.

One of the greatest problems in connection with safety in the use of insecticides does not occur from the standpoint of the professional user, the commercial aerial applicator or ground sprayer, or the grower who takes the time to read the label. The greatest area of error occurs when the buyer does not take the time to read beyond the directions of how much of the compound he should mix with one gallon of water, and I am sure we are all guilty of this at some time or another.

All the statutes in the world promulgated by your Legislature, all the regulations developed by your Department of Agriculture, all the research conducted by your universities cannot overcome human

negligence, and yet this element is so rarely mentioned when adverse effects occur as a result of misuse of a pesticide.

I would leave three thoughts with you. 1) Know the recommendations for use, 2) know the regulations governing the use, and 3) read the label and don't go outside the label.

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## SAFETY AT HOME

Are you doing everything you can to keep your own family safe from accidents?

According to Accident Facts, 1971 edition, published by the National Safety Council, the five leading causes of deaths from home accidents were: Falls; fires; suffocation from ingested object; suffocation mechanical; and poisoning by solids and/or liquids. The following questions, if all can be answered yes will indicate that your home is comparatively safe from serious accidents:

1. Do you have nonskid mats in your bathtub or shower?
2. Is your home wired to safely handle all the electrical appliances you use?
3. Are your stairway runners securely tacked down?
4. Do you have the proper type of fire extinguisher in your kitchen?
5. Do you keep front and rear steps free of ice and snow?
6. Do you insure that power tools are properly grounded before using them?
7. Do you wear safety goggles when using power tools in your home workshop?
8. Do you observe all of the safety precautions when operating power lawnmowers and snowblowers?

There were 26,500 deaths from home accidents during 1970 and over 4,000,000 disabling injuries. The injury total of 4,000,000 means that one person in 50 in the United States was disabled one or more days by injuries received in home accidents in 1970. About 100,000 of these injuries resulted in some permanent impairment. The National Health Survey indicates there are an additional 16,500,000 less serious injuries annually.

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# OFF-THE-JOB SAFETY

Did you know that there are approximately four times as many accidents off the job as compared to on-the-job accidents with a severity twelve times as great? Primarily we are dedicated to the reduction of injuries occurring while at work but we cannot ignore those which can happen "after hours." Noteworthy at this time of the year is the task of mowing our lawns and the inherent danger of the power mower. Here are rules for the power mower operator to follow:

- Read the instruction manual and know your mower thoroughly.
- Shut off and disconnect power of mower before clearing machine of debris.
- Mow in daylight hours only, unless you have good artificial light.
- Shut off and disconnect power of mower before moving it from one level to another.
- Be certain of your footing and balance, especially when mowing on an incline.
- Check your mower regularly for dangerous functioning and worn parts.
- Don't leave the mower unattended while it is running.
- Don't leave windup impulse starters in a charged position.
- Don't use the mower when the grass is wet and slippery.
- Don't refuel the mower while it is running or still hot from use.
- Don't allow children or pets in the mowing area.
- Don't lift or tip the mower while it is running, especially if it is a rotary-blade mower.
- Don't put hands or feet near moving parts, especially blades, while the engine is running.
- Be extremely careful when using a riding mower on slopes.

\* \* \* \* \*

## COULD YOU COPE WITH A CRAMP WHILE SWIMMING?

A cramp is nothing more than a hard knot in a muscle, but it sends many swimmers, even experienced ones, into a panic. You can cope easily with a leg, foot, or hand cramp, although it is painful and inhibits movement.

Take a deep breath and roll over to a facedown position in the water. Grasp the cramped area firmly with one or both hands and apply pressure. Continued pressure will usually release the cramp, but if the part is cold, you will have to knead it vigorously to restore circulation and to prevent the cramp from recurring. As soon as the cramp is gone, go to the nearest place where you can rest.

\* \* \* \* \*

# SAFETY PERFORMANCE RECORD

## CUMULATIVE QUARTERLY REPORT GOVERNMENT FORCES

1st QUARTER, 1922

PERIOD FROM JANUARY 1, 1922 THROUGH March 31, 1922

REPORTING OFFICE	NUMBER OF EMPLOYEES	MAN HOURS	DISABLING INJURIES		DAYS LOST	FREQUENCY RATE	SEVERITY RATE
			CUMULATIVE THIS YEAR	CUMULATIVE THIS YEAR			
Washington Office	247	121,536					
Denver Office	1,198	6,447 1/2					
REGION 1							
Boise Regional Office	184	86,004	1			11.4	3.7
Central Snake Project	37	16,516	1			29.5	119
Chief Joseph Dam Project	47	1,419					
Columbia Basin Project	220	115,264	1			8.5	22
Grand Coulee Dam Operations Office	287	1,9495					
Green Springs Dam Project	2	1,040					
Hunary Horse Project Office	40	18,205					
Lower Columbia Planning Office	36	16,440					
McKay Dam	1	5.5					
Minidoka Projects	64	23,088					
Sage River Planning Office	28	12,391					
Teton Basin Project	26	11,225					
Third Dam Project Construction Office	442	111,516					
Tulatin Project	22	9,049					
Upper Columbia Planning Office	31	15,001					
Yakima Project	30	1,570					
Totals & Averages	1,278	672,344	3		7	4.2	11
REGION 2							
Sacramento Regional Office	470	64,686					
Auburn-Folsom South Unit CVP Construction Office	208	109,864					
Regional Drill Core	20	11,449					
Yachuma Operations Field Branch	2	1,024					
Central Coast Dev. Field Branch	3	1,440					
Folsom Field Division	72	27,274					
Fresno CVP Construction Office	163	72,184					
Fresno Field Division	133	67,268					
Klamath Project Office	16	8,119					
L. Montan Basin Projects Office	20	10,072					
Sacramento Valley CVP Constr. Office	26	30,640					
San Luis Unit CVP Construction Office	32	19,125					
Shasta Field Division	130	67,670					
Solano Operations Field Branch	2	1,074					
Tracy Field Division	156	82,062	1		3	12.2	492
Totals & Averages	1,514	790,099	1		33	1.3	4
REGION 3							
Boulder City Regional Office	204	24,280					
Arizona Projects Office	24	44,700					
Boulder Canyon Project	147	77,454					
Lower Colorado River Project	131	6,630					
Yukon-Charley Project	115	150,101					
Southern California Planning Office	18	8,117					
Yuma Projects Office	123	59,040					
Totals & Averages	1,031	497,300					
REGION 4							
Salt Lake City Regional Office	208	114,505					
Central Utah Projects Office	197	98,154					
Ches. River Operations Office	260	1,1,381	1		3	7.6	13
Churango Projects Office	49	19,387					
Grand Junction Projects Office	111	58,058					
Lyman Project	9	3,712					
Logan Development Office	5	601					
Upper Green River Projects Office	16	8,616					
Totals & Averages	852	446,414	1		3	2.3	7
REGION 5							
Amerville Regional Office	102	47,849					
Albuquerque Development Office	28	15,466					
Austin Development Office	28	19,456					
Loan Program Projects Office	1	527					
Middle Rio Grande Project	229	127,063					
Mountain Park Project	47	1,670					
Navajo Project	84	4,351					
Oklahoma City Development Office	16	7,456					
Palmetto Bend Project	3	220					
Pecos River Office	12	7,156					
Rio Grande Project	104	81,141					
San Juan-Chama Project	20	10,776					
Totals & Averages	750	382,829					
CONSOLIDATED TOTALS							
TOTALS LAST YEAR (1921)							

\*FATALITIES INCLUDED IN TOTAL DISABLING



# SAFETY PERFORMANCE RECORD

CUMULATIVE QUARTERLY REPORT  
GOVERNMENT FORCES

1st QUARTER, 1972

PERIOD FROM JANUARY 1, 1972 THROUGH March 31, 1972

REPORTING OFFICE	NUMBER OF EMPLOYEES	MAN HOURS	DISABLING INJURIES		DAYS LOST	FREQUENCY RATE	SEVERITY RATE
			CUMULATIVE THIS YEAR	CUMULATIVE THIS YEAR      FATAL %			
<b>REGION 6</b>							
Billings Regional Office	162	78,080					
Geology and Drill Crews	9	4,480					
Lanyon Ferry Projects	19	9,213					
Fort Leck Project	43	18,889					
Missouri-Ozark Projects	189	69,120					
Missouri-Souris Projects	132	183,929					
Water System Operations Office	50	27,660					
Riverton Project	5	2,494					
Upper Missouri Projects	61	29,156	1		25	14.5	857
Yellowtail Project Office	16	16,174					
Totals & Averages	909	459,245	1		25	2.2	54
<b>REGION 7</b>							
Denver Regional Office	185	94,720					
Ergingpan-Arkansas Project	180	90,888					
Kansas River Projects	94	46,488					
Niobrara-Lower Platte Dev. Office	37	16,648					
North Platte River Projects	216	106,720					
South Little River Projects	156	80,040					
Totals & Averages	868	435,504					
<b>CONSOLIDATED TOTALS</b>							
	8,647	4,371,044	6		68	1.4	16
<b>TOTALS LAST YEAR (1971)</b>							
	8,645	17,781,946	31	1	6,653	1.7	74
<b>*FATALITIES INCLUDED IN TOTAL DISABLING</b>							
<b>JOB CORPS CONSERVATION CENTERS</b>							
Columbia Basin Job Corps Center							
Staff	69	66,656					
Corpsmen	205	286,928					
Marsing Job Corps Center							
Staff	49	48,160					
Corpsmen	166	241,760					
Collyer Center							
Staff	57	28,384					
VISTA	2	2,046					
Corpsmen	155	216,640					
Weber Basin Job Corps Center							
Staff	86	64,656					
VISTA	1	728					
Corpsmen	227	333,760					
TOTAL STAFF	241	177,856					
TOTAL VISTA	3	2,774					
TOTAL CORPSMEN	753	1,081,088					
<b>CONSOLIDATED TOTALS</b>							
	997	1,61,718					
<b>TOTALS LAST YEAR (1971)</b>							
	945	5,114,546			4	0.6	6

# SAFETY PERFORMANCE RECORD

## CUMULATIVE QUARTERLY REPORT

### CONTRACTOR FORCES

1st QUARTER, 1922

PERIOD FROM JANUARY 1, 1922 THROUGH March 1, 1922

REPORTING OFFICE	NUMBER OF EMPLOYEES	MAN HOURS	DISABLING INJURIES		DAYS LOST	FREQUENCY RATE	SEVERITY RATE
		CUMULATIVE THIS YEAR	CUMULATIVE THIS YEAR	FATAL <sup>as</sup>	CUMULATIVE THIS YEAR	CUMULATIVE THIS YEAR	CUMULATIVE THIS YEAR
REGION 1							
Boise Regional Office	3	881					
Chief Joseph Dam Project	27	1,070					
Columbia Basin Project	144	56,034	2		31	55.3	860
Teton Basin Project	63	12,405					
Third Powerplant Construction Office	1,040	456,818					
Tualatin Project	8	1,322					
Yukon Project		6					
Totals & Averages	1,585	510,736	2		31	2.9	61
REGION 2							
Auburn-Folsom South Unit CVP Construction Office	317	138,956	2	1	6,621	14.6	41,700
Folsom Field Division	7	176					
Fresno CVP Construction Office	147	54,924	2		45	39.2	883
Sacramento Valley CVP Constr. Office		440					
San Luis Unit CVP Construction Office	25	18,454					
Totals & Averages	492	208,960	4	1	6,166	17.1	22,029
REGION 3							
Boulder Canyon Project	7	2,564					
Lower Colorado River Project	2	1,700					
Parker-Davis Project	12	4,758	1		15	58.9	1,133
Yuma Projects Office		3,053					
Totals & Averages	21	11,609	1		15	86.1	1,292
REGION 4							
Salt Lake City Regional Office	20	4,347					
Central Utah Projects	180	70,649	2		9	28.3	127
Grand Junction Projects Office	26	5,817					
Totals & Averages	226	80,813	2		9	24.2	111
REGION 5							
Mountain Park Project	9	4,202					
Navajo Project	132	58,959	3		70	50.9	1,187
San Juan-Chama Project		4,238					
Totals & Averages	141	67,399	3		70	84.5	1,079
REGION 6							
Missouri-Oahe Project	11	890					
Missouri-Souris Projects	31	17,707	1		3	56.5	164
Riverton Project		643					
Upper Missouri Projects	19	7,094					
Totals & Averages	61	29,334	1		3	4.1	162
REGION 7							
Fryingpan-Arkansas Project	168	98,202	1		3	10.2	36
Kansas River Projects	18	1,611					
North Platte River Projects	16	1,861					
Totals & Averages	202	105,696	1		3	9.2	36
CONSOLIDATED TOTALS							
TOTALS LAST YEAR (1921)	2,728	1,014,547	14	1	6,197	17.8	6,108
	2,946	6,780,040	57		1,590	8.4	96

\*FATALITIES INCLUDED IN TOTAL DISABLING





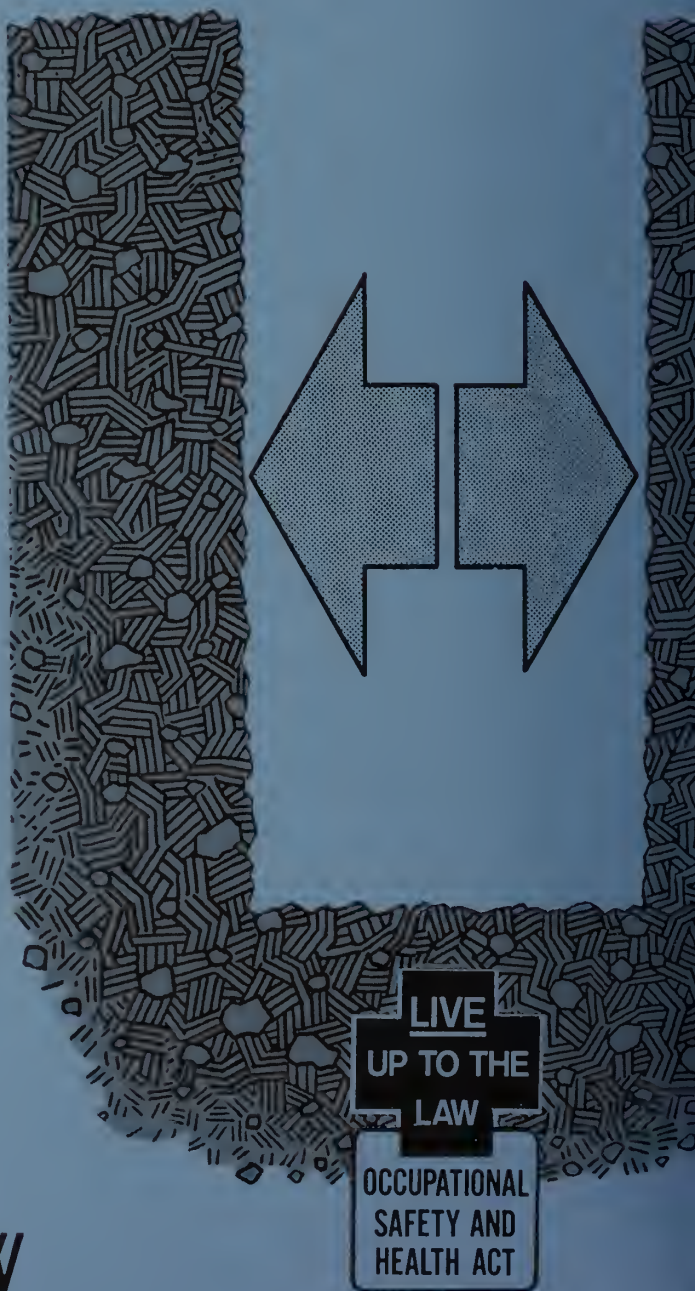


# SHORE FOR SAFETY

## CONSTRUCTION SAFETY ACT

Walls of trenches, 5 feet or more in depth, in unstable or soft material must be shored, sheeted, braced or sloped to guard against cave-ins. It's a requirement (Sec. # 1926.652) of new Federal safety standards for construction.

## OBEY THE LAW





# *Reclamation*

# **SAFETY**

# **NEWS**

**SECOND QUARTER 1972**

THE LIBRARY OF THE  
AUG 17 1972  
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AT URBANA-CHAMPAIGN



HOWARD S. LATHAM, RECLAMATION'S CHIEF SAFETY ENGINEER, RETIRES

UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF RECLAMATION  
ENGINEERING AND RESEARCH CENTER

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Front Cover Photo: Howard S. Latham retired from the Bureau of Reclamation on June 30, 1972, with over 22 years of Government service. Upon completion of service in the U.S. Navy from 1942 to 1946, he began work for the Bureau of Reclamation on the Hungry Horse Project. In 1953 he left the Bureau and worked for several major engineering and construction firms in increasingly responsible management positions until 1961 when he returned as Chief Safety Engineer for Reclamation. During his career he worked on the construction of Hungry Horse Dam, The Dalles Dam, the St. Lawrence Power Project, and Glen Canyon Dam. Mr. Latham was graduated from the University of Washington at Seattle in 1939. He is a member of the American Society of Safety Engineers, the Executive Committee Construction Section of the National Safety Council, and serves on the American National Standards Institute, Inc. In 1952 Mr. Latham received the U.S. Department of the Interior Meritorious Service Award and in 1963 he received a Special Act Award.

SAFETY NEWS is published quarterly by the Engineering and Research Center, Division of Safety, Bureau of Reclamation, P.O. Box 25007, Denver Federal Center, Denver, Colorado 80225, in the interest of accident prevention.



# United States Department of the Interior

OFFICE OF THE SECRETARY  
WASHINGTON, D.C. 20240

MAY 16 1972

## Memorandum

To: All Employees

From: Secretary of the Interior

Subject: Department Safety Policy

It is with considerable pride, that I announce that the Department of the Interior has qualified as a nominee for the 1971 President's Safety Award.

This reflects well the implementation of our policy to protect you from hazards while working, to protect our property from accidental damage, and to provide for the safety of the public when visiting or using our facilities. The Administration is committed to a vigorous government-wide accident loss prevention effort. I wish to thank each and every one of you for the complete support you have afforded this program.

Interior's record for protecting its employees is an enviable one. Over the past 15 years, our managers have supported a planned effort that has produced a 63 percent drop in disabling work injuries . . . from 13.0 injuries for every million hours worked down to 4.7. I have informed the Secretary of Labor of this noteworthy achievement in my annual report to him covering our occupational safety and health programs.

Our goal is not only to maintain this safety record, but to improve upon it. If there is any environmental work problem, unsafe operating condition, or danger to our visiting public of which you are aware, please inform me through our Departmental Safety Manager, William C. Pope (Office of Personnel Management). Our safety programs are effective only to the degree that they are supported and participated in by you.

*Rogers C. Morton*



# BUREAU SAFETY PERFORMANCE

## 1972 CUMULATIVE ACCIDENT RECORD

January 1 - June 30, 1972

### A. GOVERNMENT FORCES

<u>Region</u>	<u>Injury index*</u>	<u>Frequency rate</u>	<u>Severity rate</u>	<u>Vehicle accident rate*</u>
Pacific Northwest	0.1	2.4	6	5.2
Mid-Pacific	0.3	1.2	24	2.3
Lower Colorado	0.0	0.0	0	2.2
Upper Colorado	0.2	1.2	15	3.4
Southwest	3.0	5.2	57	3.2
Upper Missouri	1.2	3.3	36	2.7
Lower Missouri	<u>0.0</u>	<u>0.0</u>	<u>0</u>	<u>4.4</u>
Totals to date	0.2	1.5	15	3.2
<hr/>				
Totals 1971	6.4	1.7	374	3.3

\*Injury index is equal to frequency rate times severity rate divided by 100.  
Vehicle accident rate is the number of accidents per million miles driven.

### B. CONTRACTOR FORCES

<u>Region</u>	<u>Injury index</u>	<u>Frequency rate</u>	<u>Severity rate</u>	<u>Fatal injuries</u>
Pacific Northwest	688.5	7.9	8,715	2
Mid-Pacific	1,654.0	13.6	12,162	1
Lower Colorado	248.7	40.7	611	0
Upper Colorado	13.0	16.5	79	0
Southwest	230.7	27.8	830	0
Upper Missouri	1.5	7.1	21	0
Lower Missouri	<u>58.8</u>	<u>27.1</u>	<u>217</u>	<u>0</u>
Totals to Date	886.6	13.1	6,768	3
<hr/>				
Totals 1971	19.8	8.4	236	0

### C. RECLAMATION CIVILIAN CONSERVATION CENTERS

Frequency rate	1.2
Severity rate	48
Vehicle accident rate	11.4

## LOST TIME ACCIDENT ANALYSIS

Government Forces - 1972  
Second Quarter

Cumulative to Date:  
June 30, 1972

### A. ACCIDENT CLASSIFICATION

<u>Description</u>	<u>No.</u>	<u>Days lost</u>
Lifting	3	17
Vehicles	5*	87*
Struck by objects	2	12
Falls	2	28
Slip or twist	1	33
Inhalation	2	6
	<u>15*</u>	<u>183*</u>

\* Includes two Job Corps staff members with a total of 47 days lost time.

### B. SERIOUS ACCIDENTS - CONTRACTOR EMPLOYEES

A contractor employee in the Mid-Pacific Region was fatally injured when struck by falling rock in a tunnel.

A contractor employee in the Pacific Northwest Region was fatally injured when the boom of the drill rig he was operating contacted an overhead powerline.

A contractor employee in the Pacific Northwest Region was fatally injured when a cantilever form anchor system failed, and the form, concrete, and employee fell approximately 180 feet down the face of the dam.

### C. OPERATIONAL SUMMARY

<u>Operation</u>	<u>Man-hours</u>	<u>No. of accidents</u>	<u>Days lost</u>	<u>Frequency rate</u>	<u>Severity rate</u>
Administration, Clerical and Design	3, 861, 160	1	2	0.3	1
Construction	1, 439, 001	4	43	2.8	30
Investigation	785, 134	1	6	1.3	8
Power O&M	1, 830, 822	4	21	2.2	11
Irrigation O&M	<u>982, 748</u>	<u>3</u>	<u>64</u>	<u>3.1</u>	<u>65</u>
Totals	8, 898, 865	13	136	1.5	15

\* \* \* \* \*

# SAFETY AWARDS

NATIONAL SAFETY COUNCIL'S AWARD OF MERIT FOR 1971  
PRESENTED TO EMPLOYEES OF SOUTHWEST REGION



Regional Director James A. Bradley (center) is shown accepting the Award of Merit. Presenting the award and representing the National Safety Council is Wayne Storrie, Safety Director for the Santa Fe Railway Company, who is also a member of the Board of Directors of the Texas Safety Association. Looking on is Aubrey V. Ruple, Regional Safety Officer, Amarillo, Texas. Photo PX-500-219NA

## CONTRACTOR APPRAISES BUREAU SAFETY PROGRAM

The following is taken from a letter recently sent by Mr. James R. York, Manager, Personnel and Industrial Relations, Gordon H. Ball, Inc., to Mr. E. J. Brannan, Project Construction Engineer at the Bureau's Fresno CVP Construction Office, Fresno, California. Reclamation's Construction Safety Award was presented to the contractor for the exemplary safety record achieved during construction of San Luis Drain and Kesterson Reservoir, First Stage.

"On behalf of Gordon H. Ball Company and the Dillingham Corporation I want to thank you and the Bureau of Reclamation for the honor you have bestowed upon us by presenting our project #106 with the Bureau of Reclamation Construction Safety Award.

"As you know, a safety program is only as good as the men doing the work. This project, Specifications No. DC-6823, earned the award for the company due to several facts - one of those being your assistance at the job level and your working closely with the men at all times.

"Records of this type are established because the men on the project are made aware of the safety problems and they develop the proper attitudes toward safety while taking pride in doing a job well.

"Thank you again for helping the men on the job make this award possible."

Pictured below is Mr. Edward J. Brannan, Project Construction Engineer (right), presenting the Bureau's Construction Safety Award to Mr. Ernie Adams (left) of Gordon H. Ball, Inc. Photo CN805-243-5604NA



\* \* \* \* \*



## FROM THE FIELD

Lower Colorado Region, Boulder City, Nevada - Meeting of Regional Safety Personnel: Regional Safety Personnel recently met in Boulder City to discuss and review the safety program for the region in addition to acquainting themselves with the new Federal Standards for safety and health as required by the Williams-Steiger Occupational Safety and Health Act of 1970.

Pictured below, left to right, are: Hubert Jerrell, Safety Officer, Parker-Davis Project; Jim Boyles, Safety Officer, Boulder Canyon Project; Fred Burley, Jr., Lower Colorado River Project Office; Dean A. Ellsworth, Lower Colorado River Project Office; Fred J. Lasko, Regional Safety Engineer; Francis M. Warnick, Assistant Regional Director; Robert S. Oram, Lower Colorado River Project Office; Mildred Rhoades, Regional Safety Clerk; Kenneth Doering, Safety Officer, Southern California Planning Office; Curtis B. McGee, Safety Officer, Phoenix Development Office; William E. Barcus, Jr., Safety Officer, Yuma Projects Office. Photo PX-D-71923



Kansas River Projects, McCook, Nebraska - Safety Officer C. Allen Currie Receives Special Recognition: For his activities in many areas of community life, including first aid instruction to the Girl Scouts both at camp and troop levels, Mrs. Ann Tarver (below, left), Executive Director of the We-So-Braska Girl Scout Council, presented a special award to Mr. Currie at their annual meeting. In honoring Mr. Currie, Mrs. Tarver said, "We are pleased to present this plaque to Allen Currie, a member of our Board and a Girl Scout we're proud of!" (Photo B246107N)



Missouri-Souris Projects Office, Bismarck, North Dakota - Barehand Recertification Course: The photograph below was taken on May 9, 1972, showing the barehand contact with the energized 230-kv conductor made by the man in the right bucket after the buckets had been bonded to the conductor. Photo PX-D-71925



Shown below is the Bismarck Power O&M Line Crew attending the Barehand Recertification Course held in Bismarck, North Dakota, on May 9, 1972. Left to right: Donald E. Colis, Apprentice Lineman; Alvin R. Klaus, Foreman; Leonard F. Eckland, Truck Driver; Robert B. Brooks, Lineman; Roger R. Remmick, Lineman; and Joe M. Albrecht, Lineman. Photo PX-D-71926



Arizona Projects Office, Phoenix, Arizona - Incidental Motorboat Operator Graduating Class: Shown with their supervisor and safety officer are 9 of 10 employees who successfully completed the written and performance examination qualifying them as incidental motorboat operators. Pictured on the following page, from the left are: James K. Swapp, Surveying Aid; Clark B. Young, Surveying Technician; John C. Harrison, Supervisory Surveying Technician; Ronald G. Keller, Surveying Technician; Gary W. Geroy, Supervisory Surveying Technician; Robert J. Shackelford, Surveying Technician; David L. Phillips, Supervisory Surveying Technician; Gerald G. Webster, Surveying Aid; Gregory M. Tuttle, Civil Engineering Technician; Vern L. Powell, Head, Survey Section; and Curtis B. McGee, Safety Officer. Not pictured is Richard S. Taylor, Surveying Aid. Photo PX-D-71924



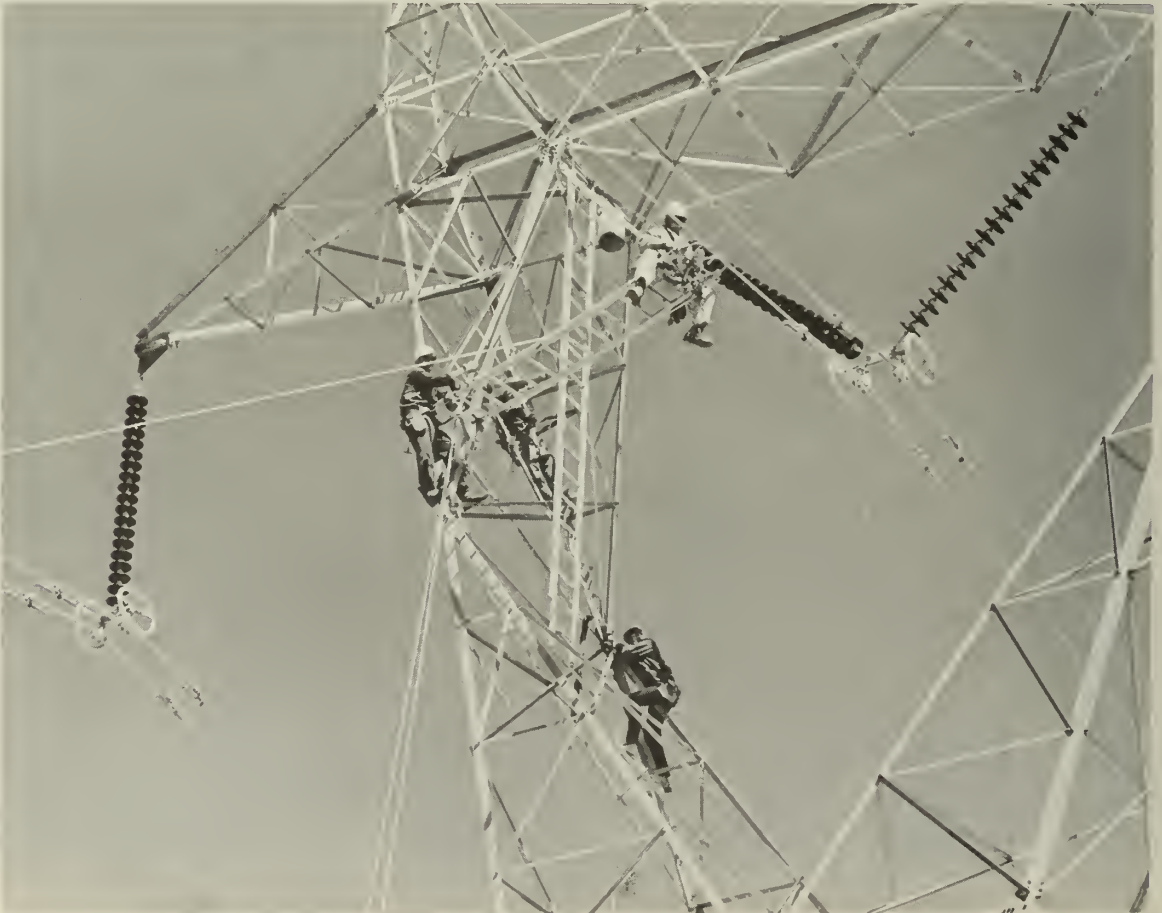




CRSP Power Operations Office, Montrose, Colorado - Live-Line Barehand Training for Transmission Line Maintenance Personnel:

A 5-day live-line barehand training program for all Project line crew personnel was conducted at Page, Arizona, during the week of June 12, 1972, to demonstrate insulated ladder procedures, particularly as a combination hotstick-barehand tool for high-voltage maintenance. Both wood-pole and steel-tower procedures were demonstrated, with special emphasis on center phase V-string applications. The program was well received by the craftsmen, and well demonstrated the potential of the insulated ladder in modern live-line maintenance.

Shown below is a view during combination hotstick and barehand replacement of a center-phase V-string on a 345-kv SVM structure, using a 14-foot insulated hook ladder. The ladder has been leakage tested, and a lineman in conductive clothing is in working position on the ladder, being swung over to the energized end of the V-string. The 20-foot fiberglass hook ladder hung vertically in the tower is used as a work platform for craftsmen working on the upper end of the V-string. (Photo P594-427-1064A)



View of linemen practicing pressure-type resuscitation and rescue on a wood-pole structure. The "victim" is being carried down the pole as resuscitation is continued, both functions being performed by a lone rescuer.

Photo P592-427-1055NA



View of an employee being "rescued" from a steel-tower structure by means of a hand-line. Note the lifeline and automatic descent device. Every "victim" wore a parachute harness under the line-man's belt; the parachute harness was tied to the automatic descent device, thus providing a backup drop-proof safety feature during the training program.

Photo P594-427-1042A

## SAFETY TALK - 1972

-- By Norman H. Moore,  
Assistant Regional Director  
Region 1 - Boise, Idaho

This is a safety talk which Mr. Moore has personally delivered to all operating offices in the Region.

If asked, most of us would come out forthright in favor of motherhood and safety. However, when it comes to safety, apparently our support in some cases is lip service only. Many of us do not seem to recognize, or if we do, we fail to take positive action to remove unsafe conditions that exist on a job. If we do recognize safety hazards, too often we have a tendency to look the other way and do nothing about them. Apparently we want to be good guys, not rock the boat, and get the job completed with the least fuss and interruption.

If we are honest with ourselves, we have to admit when we operate in this fashion we are playing a game of Russian Roulette--not necessarily with our own life and limb, but with that of a second party, be he a fellow Reclamation worker, a contractor's employee, or perhaps John Q. Public.

If there is any message that I should get across today, it is that we all must stiffen our backbones and enforce the safety laws, rules, and regulations. All of us, including contractors, must be made to understand that this is one field wherein Reclamation will not tolerate any "hanky panky," and will require enforcement for safe conditions on the job--or else!

If you want to visualize yourself saddled with a miserable job, put yourself in the shoes of Lauren Simon, Regional Safety Officer. He recently was charged with the responsibility of investigating and reporting on a fatal accident to one of our own Reclamation people. The victim was caught by a trench cave-in, and literally crushed to death. A review of this particular case demonstrated a number of violations brought about either through what appeared to be gross negligence on the part of the Bureau of Reclamation and the contractor, or ignorance, or a combination of both.

Through investigation and "Monday morning quarterbacking," we can learn a lot in a case such as the one just mentioned, but such procedures and all the sorrow we feel as individuals do not bring our friend back to life or give comfort to his family and loved ones. Locking the barn door after the horse is gone is a mighty poor substitute for recognizing a safety problem, living up



to our responsibilities, and taking corrective action ahead of time. Taking positive action ahead of time results in a truly productive safety program.

In spite of accidents we do experience, we in the Bureau of Reclamation have been proud of our safety program and record, particularly in the field of construction. Region 1 has made its positive contribution to the total Bureau program and record. However, when it comes to vehicle accidents, the story is quite different, and we'll get to that in a moment.

In 1971, Region 1's accident frequency rate for contractor personnel was 2.5 as compared to 32.7 for heavy construction in the United States, and 26.5 for the general building industry. We did much better than the Bureau as a whole, which completed the year with about an 8.0 average. It is quite obvious that the Bureau of Reclamation shows leadership in this particular aspect of safety. The accident frequency rate for Region 1 Reclamation employees in 1971 was 2.0, about equal to that of the Bureau of Reclamation as a whole, and Region 1's record for 1970. This is a good record, and at least, we are not losing ground here. In fact, we are making progress. In 1971, one out of 25 employees was injured serious enough to require medical attention compared to one out of 17 and one out of 14, respectively, in 1970 and 1969.

Industry in general, and I mean all kinds of businesses, does not have such a favorable record. Over 14,000 workers die each year as a result of on-the-job accidents, and about 3 million suffer disabling injuries. As a positive action to rectify this shameful situation, the Congress passed, and President Nixon signed into law on December 29, 1970, the "Occupational Safety and Health Act of 1970," which is now commonly referred to as "OSHA." Let me say quickly that this is an Act with teeth. Willful or repeated violations of the standards as set forth in the Act are considered a civil offense and private employers are subject to fine and/or imprisonment, depending on the seriousness of the violation.

While we in Reclamation, as Federal employees, are not subject to these penalties, we are charged by the President's Executive Order 11621 with the responsibility of implementing all aspects of the Act in all phases of our business. This covers not only field construction, but the environments in which we all work. Lack of compliance with the Executive Order in carrying out the terms of the law will reflect seriously upon our individual employment records.

Let's now consider the function of Region 1 Safety Officers, both full time and part time, and the responsibility of line supervisors as far as safety is concerned. There appears to be some confusion



in regard to who is responsible for the success of a safety program. All must understand that Safety Officers do not have line responsibility, but are staff people. Line supervisors have line responsibility, and thus the direct obligation to formulate and carry out a successful safety program. It is they who must see that a safety program is developed and placed into operation. Most important of all, they must follow through to assure success of the program.

What I am trying to say is that the Regional Director looks to each line supervisor for a successful safety program and considers Safety Officers as a resource media to help in evaluating and identifying weak points in the program so that appropriate action can be taken by the responsible supervisor.

Let me reemphasize and make it crystal clear that all supervisors, as part of their official job, are charged with the responsibility of directing a successful safety program. This means that they must learn and implement the occupational safety and health regulations promulgated by the U. S. Department of Labor. As various parts of these new safety regulations become available to us for mass distribution, copies are being sent to all offices in Region 1. Reclamation's Construction Safety Handbook has been revised to include these new safety and health regulations for construction, and copies have been distributed to all offices. Also, our construction specifications have been revised to include the terms of the new law.

From all that has been said it should be obvious that supervisors have the responsibility of seeing that all who they supervise are properly trained to work safely in an environment made as safe as possible. Field construction supervisors and inspectors must enforce the safety aspects of the specifications, and no excuses will be tolerated. In the past, policy and moral forces prompted us to see that all worked safely, and Reclamation is rather proud of its past safety program. Now we have the law of the land saying that we will provide a safe environment and enforce safe procedures for all who work for us.

I have heard it said that women drive like men only they get blamed for it. In looking at Region 1's vehicle accident frequency rate, one can only conclude that the men in Region 1 must be "lousy drivers." This past year, our vehicle accident frequency rate was 6.8, almost double that of the next lowest Region, and 48% worse than our record in 1970. Our record shows that in the past 5 years, in 65% of the accidents involving a second vehicle, government drivers were at fault. Another scary thing is that during this past year, the seriousness of our vehicle accidents increased. Several cars were totaled out, and how the occupants escaped death in all cases is a miracle.

Now if we are serious in improving safety in Region 1, here is a fertile field. My plea is, "Let's reverse this gruesome trend." Think before, not after, and become more conscious of our responsibilities when we get behind the wheel. Make sure all who drive are fit to drive.

Please, also, make sure all employees are made aware of this bad driving situation so they can take corrective action. Some of you will recall that in recent months we have fostered a campaign in an attempt to get all segments of our Region 1 family actively involved in doing something about our serious driver accident rate. If we do not take positive action and the trend continues, one of these days Lauren Simon will be out investigating another fatality. Do you realize you could be involved in a motor vehicle accident? Statisticians tell us that one out of every two persons alive today either has been involved in a motor vehicle accident in which he has suffered a disabling injury, or will be involved in such a motor vehicle accident at some future time in his life. Yes, safe driving takes extra effort and caution.

Getting back to safety in general, if we are going to err in safety, let's err on the side of the factor of safety. It is recognized that judgment plays an important part in determining safe and unsafe conditions. We expect our personnel to use good judgment; however, those of us in the Regional Office in Boise will back the safety decisions of our personnel, especially those in the field. Let me make it clear right now that we are not going to take the excuse of ignorance as the answer to a safety problem. Let's all of us zero in on safety during 1972.

\* \* \* \* \*

## CONSTRUCTION WORKERS KILLED BY FUMES

Three men were victims of carbon monoxide poisoning this spring at an irrigation construction site. The deadly gas apparently came from a pump motor being used inside a concrete siphon to remove water. The men had entered the siphon in order to shut off the pump so that caulking of leaking seams could be completed. This tragic accident points up the danger of carbon monoxide. It must be remembered that carbon monoxide is absorbed about 280 times faster than oxygen. Therefore, a person is frequently rendered helpless before he recognizes the presence of carbon monoxide. A person exposed to 1.28 percent concentration in air will become unconscious after two or three breaths and probably die in 1 to 3 minutes. Don't expose yourself to carbon monoxide! Even if it doesn't get you, it has a cumulative effect which can be crippling.

\* \* \* \* \*

# WATER SAFETY

## RECORD OF PUBLIC DROWNINGS

January 1, 1972, through June 30, 1972

### Bureau-operated Facilities:

Canals	16
Reservoirs	2
Total	<u>18</u>

### Facilities Operated by Others:

Irrigation and Water Districts	26
State or County (Recreational)	16
Total	<u>42</u>

### Summary of Total Drownings During Period:

By Operating Agency:	
Bureau of Reclamation	18
Irrigation and Water Districts	26
State or County (Recreational)	16
Total	<u>60</u>

By Type of Facility:	
Canals	38
Reservoirs	22
Total	<u>60</u>

By Activity:	
Swimming	15
Boating	8
Fishing	3
Fell into water	11
Other	23
Total	<u>60</u>

By Age:	
Under 12 years of age	8
From 12 to 25	25
From 25 to 50	20
Over 50 years of age	7
Total	<u>60</u>

## LEARN RESPECT FOR WATER

-- By Ted McCormick

(Safety Officers don't retire, even though they leave their jobs. Thus it is that Ted McCormick, retired safety officer for the Bureau of Reclamation in Loveland, Colorado, continues his effort to promote water safety. He wrote the following guest editorial which was recently published in the Loveland Reporter-Herald.)

Once again it's that time of year when everyone gets interested in spending their leisure time on, in, or around the water. Every year there are many who needlessly lose their lives by being thoughtless or just plain careless when fishing, boating, or swimming. There are safe places to swim and while perhaps our municipal pool isn't the most modern, it is still the proper place to at least learn to swim and to learn respect for water and the rights of others.

The Big Thompson River and the many canals in our area are not the places to swim. It's mighty tempting on a hot day to take a dip in the river or the canals that run through and adjacent to our City, but there are dangers that can't be seen. The water that feeds these canals and river comes out of the mountains and is much colder than water that has been in a lake for a time. An undertow can pull you under, and the banks are unusually slippery or lined with concrete making it almost an impossibility to pull yourself to safety. Again, a word of caution about using any type of inflatable object when swimming or floating in a canal or river. Most every day we can see small fry heading for the river carrying an innertube to be used for floating. It's a lot of fun, but every year we hear of people drowning as a result of their use. The tube can be punctured by a rock or any sharp object or it can easily slip out of your grasp and leave you unprotected in dangerous water. This is especially true in lakes.

If you have the opportunity to learn mouth-to-mouth resuscitation, by all means do so. It might mean the difference between life and death for someone you are with or someone could possibly save your life by knowing how to use this method. There have been about 5,000 people in the Loveland-Berthoud area, including some 1,500 in the schools, who have been trained to use the Bureau of Reclamation manikin, Resusci-Anne.

And by the way, help preserve the "No Swimming" and "Stay Out and Stay Alive" signs which the Northern Colorado Water Safety Council and the City posted at dangerous waterways throughout our City. These signs are lifesaving devices and their symbol is a message that all can understand. Unfortunately, many of them have been stolen. They must be left in place in order to serve their purpose.



ADVANCE TRAINING UNDERWATER SEMINAR  
May 23-26, 1972 Port Townsend, Washington

-- By Thomas J. Spicher  
Grand Coulee Dam Operations Office  
Coulee Dam, Washington

Since 1965 the Bureau of Reclamation has had a Bureau-manned underwater inspection program. The program has expanded from the original six-man Region 2 (Mid-Pacific) team to the present five teams encompassing about 30 divers. The Pacific Northwest, Mid-Pacific, Lower Colorado, Southwest, and Lower Missouri Regions now have diving teams. Usage of the teams has continued to expand every year. This past year included almost 800 man-days of diving. Reclamation has not experienced a disabling injury attributable to diving since the start of the program.

The concept of a Reclamation-sponsored advanced diving seminar evolved from a need for continual training. Safe performance in our underwater activities is obviously a prime concern that all members of our various teams must share individually and collectively. The enthusiastic participation of the individuals in this seminar indicated a very sincere desire to improve the effectiveness of the diving program. The advantage of bringing together a group of this type was emphasized during the inspection methods discussion by Tom Morris, Team Lead of the Mid-Pacific Region. Many practical methods of accomplishing underwater tasks, such as mapping and dark water photography, were explained in detail to allow other teams to fully utilize the background already developed by more experienced teams.

The session of safety aspects was covered by Safety Officer Tom Skordas. His discussion included reference to Section 24--Marine and Diving Operations of the Bureau's Safety and Health Regulations for Construction.

Further discussion about equipment and the need to have a personal knowledge of all gear used by an individual followed some in-water examples of poor fitting or inappropriate gear. Other in-water tests exposed the participants to close quarters, low visibility, entanglements, night diving and currents. The highlight of the below water exercises was a two-man inspection exercise on a piling structure, which was coordinated by Jim Andrews of the Mid-Pacific Region. A medium surface swim, currents, fair-to-poor visibility, 45-foot depths, and a beautifully distracting structure were incorporated in a preplanned dive of less than 15 minutes per team. The exposure to the salt water conditions for the inland divers served to increase their awareness of their ability to cope with new and unusual conditions.



\* \* \* \* \*

The 20 full participants in the first Reclamation-sponsored advanced diving seminar, presented by the Pacific Northwest Region, are pictured above, standing, left to right: Bill Nelson, Asa Davis, Jim Fletcher, Darrell Temple, Ray Nelson, Ben Bennett, Gary Frey, Don Nelson, Howard Carver, Larry Boll, Jim Andrews, Erv Zavalney, Ernie Lendemann. Kneeling, left to right: Frank Dimick, Charley Felker, Bob Haase, Fred Johnson, Tom Spicher, Brent Carter, Tom Morris. Photo P222-117-292

## POTENTIAL HAZARD FROM SYNCHRONOUS CONDENSER HYDROGEN LEAKS

The Bureau recently experienced an explosion in an electrical terminal box located on a synchronous condenser. Investigation proved that hydrogen had leaked into the terminal box displacing the air and followed a conduit up to the lighting switch adjacent to the condenser. When the light switch was turned off, the arc on the switch contacts ignited the mixture, ultimately causing the explosion in the terminal box. The explosion had sufficient force to blow the cover off which was supported by six 1 1/4-inch - 20 machine screws.

Because many electrical and piping circuits enter and leave a synchronous condenser pressure shell, it is not uncommon to experience leaks; in fact, it is a continuous problem to maintain minimum leakage. Therefore, accepting that minimum leaks will always be present, care should be taken to assure that the escaping hydrogen is not supplied an escape path to a switch area or other areas where ignition of the hydrogen gas could result.

The following actions should be taken to eliminate this type of a hazard and make our synchronous condenser installations meet the mandatory requirements of the Occupational Safety and Health Standards as listed in Section 1910.103, Hydrogen.

1. Section 1910.103(b)(1)(ii) Safety relief devices. - Safety relief devices must be installed on all hydrogen manifolds. The devices shall be arranged to discharge upward with no obstructions preventing passage of the hydrogen to the atmosphere. The piping from the safety relief device to the atmosphere shall be arranged so that moisture cannot collect and freeze in a manner that would interfere with proper operation of the device.
2. Section 1910.103(b)(1)(v) Marking. - The hydrogen storage location shall be permanently placarded as follows: "HYDROGEN - FLAMMABLE GAS - NO SMOKING - NO OPEN FLAMES," or equivalent.
3. Section 1910.324(d)(1) Hazardous locations - Class I, Division I. - All conduits entering or leaving terminal boxes mounted on the synchronous condenser shall be sealed no more than 18 inches from the terminal box.

"ISOFOAM"-type sealing material is suitable for the seal application required in (3) above. All piping, tubing, and fittings must be suitable for hydrogen service and no cast iron pipes or fittings are permitted.

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STATE OF THE ART OF CONTROLLING  
OCCUPATIONAL HEALTH HAZARDS  
DURING RAPID MACHINE TUNNELING OPERATIONS

-- By Howard S. Latham and Ronald J. Searle



Howard S. Latham  
Chief, Division of Safety  
Bureau of Reclamation  
Denver, Colorado



Ronald J. Searle  
Regional Safety Engineer  
Bureau of Reclamation  
Salt Lake City, Utah

In April 1964 the Bureau of Reclamation awarded the first contract for rapid machine excavation of a water conveyance tunnel. Since then the Bureau has excavated seven tunnels with a total length of over 190,000 feet utilizing rapid excavation tunneling machines. Tunnel bored diameters have varied from 9' 0" to 20' 10" (See Table #1) and tunnel lengths from 5,000 feet to 67,000 feet. Driver and cutter units varied from 43 rolling teeth and eight rolling discs mounted on a rotating head driven by five 200 HP 23,000 volt electric motors to 20 discs and one tricone unit mounted on a rotating head driven by two 100 HP 440 volt motors. All tunnels were driven with a laser beam guidance system governing both line and grade. Trailing conveyors and rail haulage systems were



used to dispose of the excavated material. Approved Bureau of Mines diesel locomotive engines for waste trains were prevalent power sources supplemented by battery units on some projects. Sandstone, conglomerates, agglomerates, siltstone, shale, and granite were the geological formations encountered, with sandstone and shale the preponderant material.

Tunnel support systems utilized were structural steel ribs; rock bolts and metal plates; and shotcrete, or combinations of these. Progress varied from 51-1/2 feet to 154 feet per working day for three shifts, depending on rock material and supports required. One contractor established a record rate of advance of over 400 feet in one day, 1,905 feet in one week and 6,848 feet in one month.

Such diversified experience in underground machine excavation methods presented an excellent opportunity to observe, analyze, and evaluate associated environmental health problems. Also, to develop measures for controlling these hazards within specified hygienic limits.

With the exception of laser beam radiation, occupation and environmental health hazards encountered differed little from those found in conventional mining operations. The prevalent air-borne contaminants were carbon monoxide, carbon dioxide, oxides of nitrogen, methane gas, and air-borne dust. Also, laser beam radiation, oxygen deficiencies and high noise levels presented a hazard. Carbon monoxide, carbon dioxide, oxides of nitrogen, and oxygen concentrations were found to be within specified limits when general ventilation requirements adequate for dust control and diesel engine emissions were maintained.

Air-borne contaminant control systems consisted of primary ventilation, heading exhaust systems, water sprays on the cutting heads and at conveyor dump points, and water jackets or similar dust control systems on all pneumatic drilling equipment. All diesel-powered equipment used underground was approved and certified by the U.S. Bureau of Mines under either Schedule 24 or 31. Ventilation requirements for the diesel equipment as recommended by the Bureau of Mines and fresh air requirements for men employed underground were used as a basis for determining air exchange volume. In most operations air volumes adequate to operate the diesel locomotives proved satisfactory for controlling dust when supplemented by water sprays. However, additional volumes were required to control methane gas or excessive dust in some operations.

Primary and secondary exhaust or ventilation systems consisted of vent lines varying from 24 to 42 inches in diameter complete with inline vane-axial fans located at the portal and in series along the

duct system. Number and locations of inline fans were dependent on duct static pressure losses. Some systems incorporated water spray type collectors to reduce inline dust buildup and fan blade wear. In one tunnel additional ventilation was obtained by drilling a 24-inch ventilation shaft from surface to tunnel bore and exhausting methane gas and dust-laden air to the surface.

As stated before, experience has shown that most toxic and flammable air-borne substances in machine bored tunnels can be controlled within specified limits through adequately designed and maintained ventilation and water-type dust suppression systems. Atmospheric sampling underground indicates that carbon dioxide, carbon monoxide, oxides of nitrogen, and oxygen deficiencies are not a factor of concern when there is sufficient air exchange at the tunnel heading and throughout the tunnel as it is advanced.

Control of air-borne dust and methane gas continues to be a major problem in tunnel boring operations. Per cent free Silica ( $\% \text{SiO}_2$ ) content of excavated material in Bureau tunnels averages around 30% with highs of 41%. Using the formula developed by the Amer-

ican Conference of Governmental Industrial Hygienists, 
$$\frac{250}{\% \text{SiO}_2 + 5}$$
for dust count in millions of particles of respirable dust per cubic foot of air, the threshold limit values (TLV) become 7.1 for 30% and 5.4 for 41%  $\text{SiO}_2$ .

It is interesting to note reductions in acceptable TLV's occurring during the relatively short time machine boring has been used, and how the resultant low permissible atmospheric dust concentrations currently in effect have required more sophisticated control systems and design criteria.

To this point in time, most ventilation system design volumes have been determined by using capacities required for Bureau of Mines diesel engine certifications under Schedules 24 and 31 and in some cases adding 200 CFM per employee as required by the Construction Safety Act. While, generally, quantities calculated in this manner have been adequate for dust control purposes, they cannot be considered as absolutes in designing dust collection and explosive gas control systems.

In earlier mole operations air entering the tunnel was exhausted from a fan line opening near the mole operator's station and no attempt was made to control dust at the dust shield or conveyor dump points. This method proved totally inadequate to control dust concentrations. As a result, branch ducts were run from the main vent line to the dust shield and to pickup points near the conveyor dump points. This system improved conditions, but was still unsatisfactory.

The next improvement consisted of installing branch ducts to the dust shield and enclosed exhaust hoods at the conveyor dump points supplemented by water spray heads at the dump points and cutter heads.

Dust sampling indicated that air-borne dust concentrations were being reduced and during normal operations were below acceptable TLV's. However, enclosing the dump points and exhausting dust-laden air from the enclosures and dust shields created operational problems from fan line extensions and dust buildup in vent lines.

As the mole advanced the fan line had to be broken and sections added causing high dust concentration during this interval. High dust grain loadings in the exhausted air caused excessive fan blade wear and dust buildups in fan lines. This, in turn, reduced the effectiveness of the system and high dust concentration persisted. This problem of fan line extension has been eliminated in several ingenious ways with the method explained below one of the latest and most successful.

An extra length of fan line is laid inside of a metal cylindrical enclosure mounted on the trailing conveyor. As the boring machine moves forward the fan line is drawn through the enclosure until it nears the end. The enclosure is then opened and an extra length of line is placed in the enclosure, attached to the main line, and the enclosure again closed. This method of fan line extension requires little or no down time and permits continuous operation of the dust control system.

The problem of dust buildup in duct system and fan blade wear has been partially overcome by installation of wet-type air scrubbers in the fan line. The scrubber uses a simple method of collection. Air velocity is reduced by enlargement of the duct dropping out large entrained particles. The air then flows through a series of wetted baffles arranged so travel is directed through two or three 90° turns, causing smaller particles to impact on the wetted baffles. A spray system continuously flushes the collected particles into a sump. This scrubber arrangement drastically reduces grain loadings in ventilation lines and excessive wear of fan blades.

In one installation the exhaust system was further refined by placing a sophisticated scrubber in the main exhaust line. Dust-laden air exhausted from the dust shield and conveyor dump point ran through an inline collector utilizing a wet screen type baffle arrangement for wetting dust particles. The wet particles were separated by centrifugal action and the collected material flushed into a sump for disposal. A fan mounted on the clean side of the collector was used as a power source and discharged the clean air back into the general tunnel atmosphere near the waste car loading point.



A secondary system utilizing a fan line with a pickup point in the general tunnel area near the discharge end of the first system exhausted air to the surface through a fan line connected to a high pressure blower mounted outside the tunnel portal. Recirculation of some air in this type of system can cause excessive buildup of air-borne respirable dust particles unless a strict preventative maintenance program is implemented. Also, general air temperatures may be reduced by 15° to 20° F. and humidity increased to near 100%.

Spray systems used to reduce dust concentrations were ordinary commercial spray heads connected to high pressure water lines, placed at the source of high dust generation - conveyor dump points and cutter heads. Cutter heads were wetted by placing high pressure sprays at the cutter head throat and directing the water behind the dust shield. One system consisted of water piped to a rotating knuckle at the cutter head center axes and branch lines from the knuckles to spray heads near the cutters. This system was satisfactory, but required constant maintenance to insure operation as knuckle wear was excessive.

Water volume from the spray heads varied from three gallons to seven gallons per minute and averaged 1 GPM/cutter. No installations utilized fog or atomizing water-compressed air nozzles to reduce water particle size and increase number of droplets, which I believe has possibilities.

In addition to the spray systems mentioned, water is utilized as a control means at other dust producing sources such as jack hammers, jack leg drills, etc. through use of water jackets.

Trailing conveyor systems, mole and all interconnected parts were periodically washed down with a hand-held spray nozzle to eliminate resuppression of settled dust.

Generally, this is the method of dust control in machine drilled tunnels.

Control of methane and other explosives and flammable gases presents further problems and elimination of these hazards must be considered long before tunneling operations are undertaken.

Specifications for tunnels bored in suspected gaseous formations must provide that all points of ignition be eliminated and only electrical and diesel equipment approved for use in gaseous atmospheres be used. Air exchange capacities must be designed to dilute gas concentrations below 2.0% of lower explosive limit at head and 1.0% in general tunnel atmospheres 12 inches from crown.



In Bureau operations the tunnel must be inspected by a Bureau of Mines representative and excavation carried out in compliance with his recommendations. Approved type testing devices recommended by the representative are obtained and used as directed. Automatic methane detection systems with sampling head near the face are preferred. In addition, periodical samples must be taken by personnel experienced in the use of detection devices. All detection units must be checked and calibrated periodically through the use of a gas concentration standard supplied in containers by detector manufacturers. In addition, 1-3/8" or larger drilling feelers or pilot holes drilled 15 to 25 feet ahead of excavation are recommended to determine the nature and condition of the material to be excavated and if gas is present. Information from these drill holes and air samples are analyzed to determine if additional ventilation or control methods are required.

In one tunneling operation where methane was encountered several miles in from the portal, the following procedure was utilized to maintain concentrations within safe levels.

Since the existing ventilation system was incapable of diluting the methane to safe levels, additional fresh air was required. Enlarging the existing vent line or placing additional fans in the line was considered impractical, so a 24-inch ventilation shaft was drilled several hundred feet from the surface to the tunnel bore near the heading. Additional air was vented through this hole to the surface and several gas producing rock bolt holes and joints were enclosed and the gas vented through the ventilation shaft eliminating release into the tunnel proper. Periodic samples of the air being exhausted were obtained to insure safe levels of explosive gases.

Two major problems encountered in controlling dust, fumes, and flammable gases in machine tunneling operations are poor design of the control systems and an ineffective preventative maintenance program. On many occasions machines were designed to accommodate proper exhaust systems but extensive remodeling of the unit for a specific operation required major changes in the control systems. These changes or field alterations often did not follow good engineering practices. Holes in fan lines or breaks in fan line connections allowed air to enter the fan lines behind the machine, reducing the effectiveness of the control system. Also, there often was no static or damper balancing of branch ducts; consequently, actual branch line volumes did not conform to design standards.

In some installations while the design and construction of the branch duct system were adequate, collection hoods were removed to repair conveyors, pulleys, rollers, etc. Another problem encountered was the lack of pitot tube openings in branch or main ducts for the purpose of checking operating volumes and setting of dampers or

blast gates. Air volume measurements were obtained in the tunnel bores with a rotating vane anemometer, velometer, etc., which were only useful for determining if total design volumes were being met. This measuring method is unsatisfactory in machine bored tunnels since the measurement shows only total quantities and lacks the ability to determine branch duct quantities.

Of the many systems observed, not one was continually maintained or operated within recommended design, construction, and maintenance standards. However, many did control air-borne contaminants within TLV limits most of the time.

The discussion to this point has been on the major occupational health hazards and their control. Two other hazards that need brief discussion are: (1) laser radiation, and (2) noise.

Laser radiation has presented no serious hazard since only low-powered continuous wave gas semi-conductor laser systems are employed. The beam is usually above or below eye level, the target so situated to avoid specular reflection and the units are not sighted by looking directly into the beam.

Noise level exposure to employees exceeds the threshold limits promulgated under the Occupational Safety and Health Act in most tunneling operations. Table Two is a composite of noise surveys from several tunnels and reflects the average noise levels for many operations or occupations.

Comparing these levels with the OSHA Standards (Table Three), it is apparent that considerable attention must be given to this subject.

Currently most hearing conservation programs consist of providing employees with personal protective equipment in the form of ear muffs or plugs with little enforcement as to their use. Negligible field efforts have been directed toward reduction of noise levels through engineering and design methods.

It is obvious that present protective measures fall far short of ideal; and considerable energy, effort, and research must be expended in this field.

It is the intent of Bureau of Reclamation to expend this energy and to initiate a research program directed at further identifying, reducing, and/or eliminating many of the occupational hazards associated with this type of tunneling operation.

In 1973 the Bureau will begin a field-orientated research program. An 8.1 mile long, 10-foot diameter water conveyance tunnel entitled

"Stillwater Tunnel" is to be placed under construction in Central Utah. Reclamation is planning to conduct an extensive research program in conjunction with construction of this tunnel. A large portion of this research money will be spent in an effort to improve the environment in tunneling operations.

As mentioned before, the present method of determining fresh air quantities for controlling air-borne contaminants utilizing recommended diesel engine air volumes is not satisfactory. There are and have been for years, formulas and criteria for determining air volumes and adequate system design standards for controlling air-borne contaminants in crushing, conveying, and hauling systems. Such information is contained in articles and publications by noted authors in the field. (1)(2)(3)(4) Using these standards as a basis, new parameters will be developed for use in design of control equipment for rapid excavation machines. A comprehensive automatic atmospheric monitoring program for tunnel atmospheres will be developed and evaluated utilizing procedures and equipment outlined in Bureau of Mines publication (5), equipment manufacturer's specifications, research papers presented in this and other conferences, and other sources.

Such a system has become extremely important since working atmospheres must be constantly monitored to insure protection under rapidly changing conditions now occurring. Air samples obtained and analyzed under present methods (explosive gases excepted) have time lags of several days between sample time and analysis results. This time factor makes results obsolete before received because of rapidly changing conditions.

Another important object of the research program will be preemployment and periodic examination program including chest x-rays and audiograms. Information gained from this study will assist in determining if present TLV's are adequate for construction personnel employed underground.

At present, considerable reliance is placed on weighted averages for Silica dust and noise levels to determine if exposure is below TLV. Such determinations have been made without benefit of adequate numbers of samples or details of working time in respective exposures producing unreliable values. Coupling greater numbers of samples with better control of exposure time and an adequate physical examination program under controlled conditions should provide useful data for future limit values.

In closing I would like to emphasize that some physical hazards underground have been or will be covered by other papers in this Conference and no attempt has been made to discuss these subjects in detail. It is obvious that a reliable safety and health program must provide protection against all hazards developed in underground operations.

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TABLE ONE

NAME OF TUNNEL	BORED DIAMETER	GEOLOGICAL FORMATIONS	SUPPORT SYSTEMS	CUTTERS	GUIDANCE SYSTEM	PROGRESS	WASTE DISPOSAL	VENTILATION LINE	VOLTAGE SUPPLY	ROCK TEMPERATURES
Azotea	13' - 4"	Shale Sandstone	Structural steel ribs, Rock bolts and metal shapes	25 or 29 disc, 1-tricone in center; Rotation by 4 - 100 HP, 440 volt AC motors	Laser Beam	Average 153 ft. per working day in shale; Average 72 ft. per working day in sandstone	Trailing Conveyor and Train	24"	4,160 volts	65° - 78° F.
Blanco	10' - 7" and 10' - 0"	Shale	Rock bolts and metal shapes, Steel ribs	22 - 11' disc, 1-tricone in center; head rotated by 4 - 75 HP, 3 phase 440 volt motors	Laser Beam	Average 154 ft. per working day - (14.2 ft./hr.) Maximum 21.8 ft. per hour	Trailing Conveyor and Train	24"	4,160 volts	93° F.
Oso	10' - 7" and 10' - 2"	Shale	Rock bolts and metal shapes	22 disc, 1-tricone in center; Rotation by 4 - 75 HP, 440 volt motors	Laser Beam	Average 70.4 ft. per calendar day	Trailing Conveyor and Train	24"	4,160 volts	74° F.
Tunnel No. 1	20' - 10"	Sandstone Shale	Light rib support; Rock bolts	43 rolling teeth and rolling discs; head rotated by 5 - 200 HP, 2300 volt electric motors	Laser Beam	Maximum for 1 day 160 ft. Average per working day 51.5 ft.	Trailing Conveyor and Train	42"	2,300 volts	65° F.
Starvation	9' - 6"	Sandstone Shale	Rock bolts, Rib supports	1-tricone and 20 disc head; Rotated by 2 - 100 HP, 440 volt motors	Laser Beam	Maximum for 1 day 128 ft. Average for 1 day 64.4 ft.	Trailing Conveyor and Train	24"	4,160 volts	58° F.
Water Hollow	12' - 11"	Sandstone Siltstone Shale Conglomerate	Steel ribs	1-tricone and 29 disc; head rotated by 4 - 100 HP, 440 volt motors	Laser Beam	Maximum for 1 day 180 ft. Average per day 96 ft.	Trailing Conveyor and Train	24"	4,160 volts	40° - 70° F.
River Mountains	12.0'	Rhyolite and Rhyodacite Conglomerate and Agglomerate	Rock bolts	31 cutters, 26 steel Kerf type, 1 tooth type, 4 tooth or tungsten carbide insert Kerf type as gage cutters	Laser Beam	Average per working day 108 ft. Maximum per day 293 ft.	Trailing Conveyor and Train	30"	4,160 volts	82° F.

TABLE TWO

NOISE LEVELS FOR OCCUPATIONS AND/OR OPERATIONS  
IN RAPID MACHINE EXCAVATED TUNNELS

<u>Location or occupation</u>	<u>Sound level dba slow response</u>
Compressor building	104
Riding in enclosed man car	86 - 88
Sitting in muck car behind motor	94 - 102
Engineer seats	95 - 105
Rock bolt drill jumbo	100 - 117
Directly below vent fan at heading	98 - 102
Near shotcrete operation	98
In steel forms during concreting operations	110 - 115
100' from steel forms during concreting operations	103 - 105
Mole operator's platform	91 - 100

TABLE THREE  
PERMISSIBLE NOISE EXPOSURES

<u>Duration per day, hours:</u>	<u>Sound level dbA slow response</u>
8	90
6	92
4	95
3	97
2	100
1-1/2	102
1	105
1/2	110
1/4 or less	115

When the daily noise exposure is composed of two or more periods of noise exposure of different levels, their combined effect should be considered, rather than the individual effect of each. Exposure to different levels for various periods of time shall be computed according to the formula set forth below:

$$F_e = \frac{T_1}{L_1} + \frac{T_2}{L_2} + \dots + \frac{T_n}{L_n}$$

where:

$F_e$  = The equivalent noise exposure factor.

$T$  = The period of noise exposure at any essentially constant level.

$L$  = The duration of the permissible noise exposure at the constant level.

If the value of  $F_e$  exceeds unity (1) the exposure exceeds permissible levels. A sample computation showing an application of the formula is as follows. An employee is exposed at these levels for these periods:

110 dbA 1/4 hour.

100 dbA 1/2 hour.

90 dbA 1-1/2 hours.

$$F_e = \frac{1/4}{1/2} + \frac{1/2}{2} + \frac{1-1/2}{8}$$

$$F_e = 0.500 + 0.25 + 0.188$$

$$F_e = 0.938$$

Since the value of  $F_e$  does not exceed unity, the exposure is within permissible limits.

\* \* \* \* \*

# Management for Accident Control

**ABSTRACT.** Great changes are taking place in the methods of management for accident control. Dr. Tarrants discusses these and how they relate to safety professionals. Management will be looking to the latter more and more as individuals who can step far enough back from day-to-day operations to take an objective view of the entire system by which an organization is run rather than as simply a specialist intent on examining the safety aspects alone. The safety professional's concern with before-the-fact problem analysis, his contributions to product development, and his use of more objective techniques of systems performance appraisal will make him a valuable member of the management team.

It has become almost axiomatic in modern accident prevention work that management should and must assume responsibility for accident control as a normal part of its job of managing. Most managers will agree that maintaining a safe work environment and controlling the unsafe behavior of workers is an important part of the job of managing an organization. I have yet to hear of a manager who has come out publicly against safety or who has stated that safety is not a "good thing." With so much outward support for safety on the part of managers, why do we still hear about so many management problems?

## The Frame of Reference

I am not suggesting that managers don't really believe what they are saying or that they are not more than willing to act favorably and forcefully when accident problems arise. I am saying that the frame of reference used by most managers when viewing their safety problems and responsibilities is totally different from objective reality, and that unless the managers' perspectives are altered to reflect true "real world" conditions, the chances for successfully controlling accidents will remain extremely remote.

What I am advocating is a complete philosophical reorientation on the part of managers—a reorientation that will take them away from the contemporary philosophy that an accident is not an accident unless a disabling injury or property-damage loss occurs, that a majority of these accidents are unavoidable, and that the intensity of prevention interest is a direct function of the magnitude of the loss involved.

As one might speculate, ten fatalities occurring in a plant on Wednesday afternoon, or any other afternoon for that matter, produces an immediate management response. Yet, the existence of the very same causal factors on the previous Tuesday, Monday, all last week, and perhaps weeks before produced no such reaction, even though the potential for the fatal result was there all the time.

Most of our present-day safety efforts are based on after-the-fact appraisals of loss-producing "causes" that happen by chance to produce an accident of sufficient severity to be included within the limits of our reporting criterion. If we follow the Z16.1 American Standard\*, this criterion for an accident requires more than 24 hours lost time or some permanent disablement or death.

Even within the limits of our present reporting criterion, the amount of management interest is usually directly proportional to the amount of loss. We need to im-

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press upon managers the necessity for changing our presently-used accident problem appraisal procedures, with their emphasis on after-the-fact analysis and their sensitivity to fortuitous severity oscillations.

What is needed is the application of modern techniques of measurement with their emphasis on predicting and controlling the loss-potential factors within the total management system. The present-day safety engineer concentrates most of his efforts on solving problems; that is, providing answers, when the emphasis should be placed on looking ahead and finding the right question.

A good place to start in trying to change management philosophy is in the manager's own world. What is he thinking about? What is his primary job as he sees it? What is his value system? What motivates him to act? What are his decision processes? Let's take a look at the manager's job with a view toward developing an understanding of management's approach to problems.

## What Is Management's Work?

What is management's work? Some authors have stated that a good manager is tough but not brutal; firm but fair. About 90 percent of a good manager's time is devoted to the professional job of managing other people and things, while around 10 percent is spent doing work as an individual contributor. Contrast this with the rever-

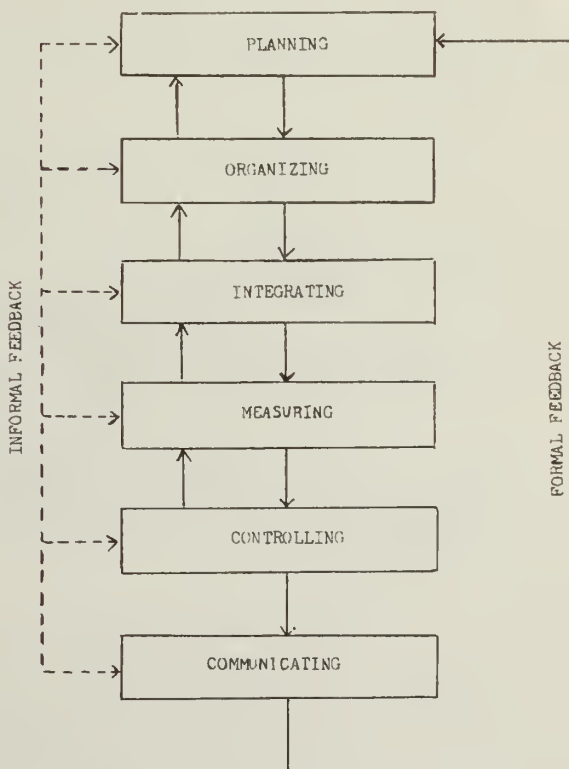


FIGURE 1. FLOW DIAGRAM OF MANAGEMENT TASKS

\*American National Standards Institute (ANSI). *Method of recording and measuring work injury experience*. USAS Z16.1-1967. New York: American National Standards Institute, 1967.



percentages for the typical worker: 90 percent of the worker's time is spent doing work as an individual contributor, while only 10 percent or less is devoted to management activities. An over-balance which deviates too strongly from this ratio is indicative of reduced effectiveness or even a potential breakdown in the system.

A good manager is involved in:

1. Planning
2. Organizing
3. Integrating (sometimes called coordinating or compromising)
4. Measuring
5. Controlling
6. Communicating

Let's take a closer look at these management tasks (see Figure 1).

1. **Planning**—determining in advance what is to be done and how goals and objectives are to be accomplished. Planning includes:

- a. Clarifying objectives
- b. Establishing policies
- c. Mapping programs and campaigns
- d. Determining specific methods and procedures
- e. Fixing day-to-day schedules

2. **Organizing**—dividing and grouping the activities necessary to carry out the plans into individual jobs and defining the established relationships between individuals filling these jobs.

3. **Integrating**—Involves putting things together so that they cannot easily be pulled apart. This includes the vital matter of indicating plans to those who are responsible for carrying them out, and also establishing a favorable day-to-day personal relationship between the "boss" and the subordinates. A part of integrating is:

a. **Coordinating**—synchronizing and unifying the actions of a group of people toward a common objective. It is an attempt to hold together a number and mixture of positions.

b. **Compromising**—in effecting a compromise we are concerned with resolving the difference between two plans by the adoption of a third plan, often containing some of the characteristics of both original plans.

4. **Measuring**—determining how closely operating results conform to the operating plans. Measurement is an absolute prerequisite for prediction and control of performance. It involves:

- a. Establishment of standards or criteria of performance.
- b. Comparison of actual results against the standard.
- c. The implication that necessary corrective action will be taken when performance deviates too far from the plan.

5. **Controlling**—maintaining system variables within acceptable tolerance limits. Controlling involves:

- a. Defining acceptable tolerance limits
- b. Determining, based on information feedback derived from system measures, when systems variables are approaching unacceptable tolerance thresholds.
- c. Initiating actions necessary to maintain progress toward the accomplishment of system goals and objectives.

6. **Communicating**—a transfer of information, ideally involving a linking or sharing of perceptual fields between sender and receiver. Communications is the connecting thread which is interwoven among all management tasks and serves as the primary unifying force in accomplishing these tasks.

### Many Favor Integrated Concept

Numerous management specialists are advocates of the integrated principle of management. Their position is that compromise seldom produces satisfactory results. Often a potentially optimum solution is colored by personal biases, prejudices, personality conflicts, and other considerations when compromises are attempted. In these situations no one is really satisfied with the results. Coordination with ultimate integration and proper communication results in working together toward common

goals and objectives so that things form a unified, cohesive whole. From a safety standpoint, integration is probably the single most important activity for the safety professional\* to pursue. Instead of compromising safety principles for the sake of expediency, convenience,

### About The Author



**Dr. William E. Tarrants** currently serves as Acting Director for the Office of Safety Manpower Development, National Highway Safety Bureau, of the U.S. Department of Transportation's Federal Highway Administration. In this post, which he has held since 1967, he is responsible for planning and administering a program designed to increase the supply and improve the skills of all classes of manpower required to implement effective traffic safety programs at the federal, state, and local levels throughout the nation.

Dr. Tarrants is a graduate of the Ohio State University, where he received the degrees of bachelor of industrial engineering and master of science in industrial engineering. He earned the Ph.D. degree in education from New York University. Prior to assuming his present position with the Department of Transportation, he served as Chief, Division of Accident Research, Office of Industrial Safety, Bureau of Labor Statistics of the U.S. Department of Labor, with primary responsibility for the conduct of detailed special studies of injury rates and accident causes within selected industries throughout the United States. He currently is serving as ASSE's Vice President for Research and Technical Development.

In addition to the American Society of Safety Engineers, Dr. Tarrants holds membership in many other professional and technical societies, including the American Institute of Industrial Engineers, the Systems Safety Society, the Veterans of Safety, the Human Factors Society, and the American Association for the Advancement of Science. He has authored many papers and delivered numerous oral presentations concerning the subject of safety and accident prevention.

\*The term "safety professional" is used throughout this discussion as a broad generic term for the professional working in the occupational safety and health field. It is considered to include such related titles as "safety engineer," "safety manager," "safety specialist," "safety director," and "safety supervisor."

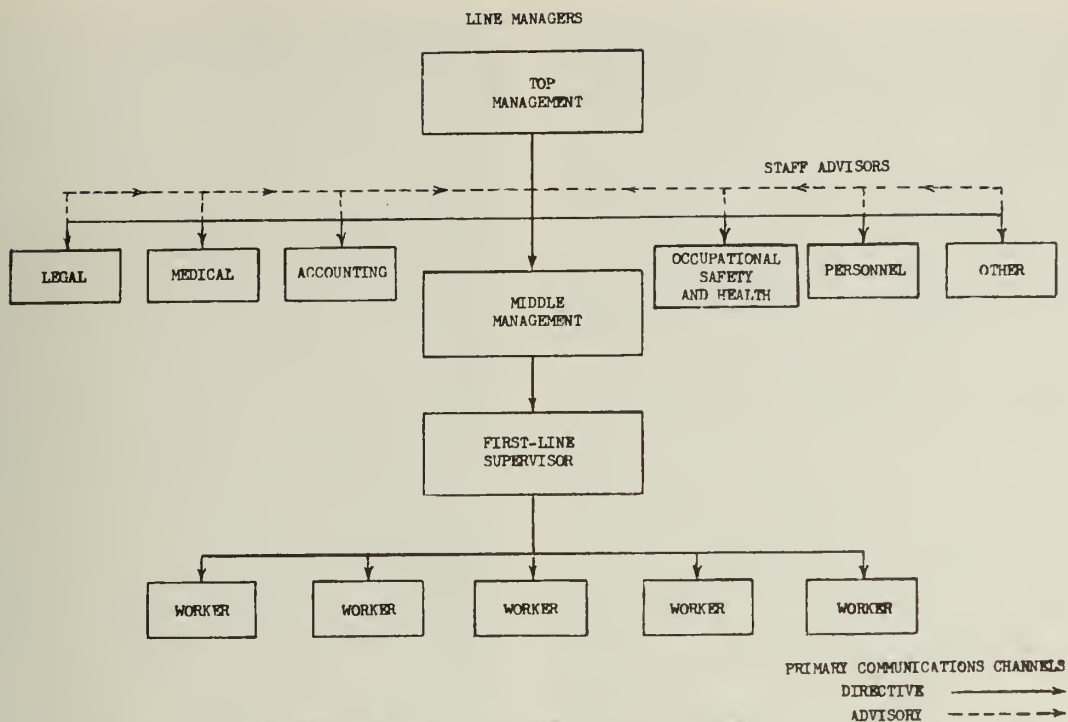


FIGURE 2. LINE AND STAFF MANAGEMENT ORGANIZATION MODEL  
SHOWING THE SAFETY PROFESSIONAL'S POSITION IN INDUSTRY

or any other reason, managers should concentrate on integrating safety into the total system so that it assumes its rightful place in the scheme of things.

In order to integrate safety into line management functions effectively, it is essential that we keep in mind certain basic objectives of management. We should avoid basing our approach in safety work on purely an emotional appeal. Managers are most receptive to a hard-headed, rational, logically developed presentation which has as its purpose the communication of valid decision-making information which conforms to the managerial system of values and objectives. The safety professional's main tool of persuasion is positively communicated information derived from objective, valid, reliable, and sensitive techniques of measurement. Above all, this information must be collected and presented with the objectives of management in mind.

What do managers consider important? What are their values? What are their goals and objectives? How are they motivated to action?

1. *Profit* is important. A manager is interested in making money for his company and for the stockholders. Safety activities supported on the basis of a valid reduction in costs will usually be convincing to managers and tend to receive their support. But basing a safety program on reduction in accident costs presents several major problems.

a. It is difficult to identify all costs related to accidents. We have direct costs, indirect costs, insured costs, uninsured costs, costs of injurious accidents, costs of non-injurious accidents, and so on.

b. It is difficult with the use of our present measurement techniques to show a manager who adopts our suggestions what is in it for him. It is difficult to say that "X" dollars spent on accident prevention will produce "Y" dollars saving in accident costs. Because of the probabilistic nature of accident consequences, a definite cost/benefit ratio for a specific accident countermeasure becomes somewhat elusive when we attempt to identify it.

c. Suppose we do adopt the new measures of safety performance now being developed and we are able to de-

tect and correct most of our accident problems before-the-fact, before the big dollar loss, before the injury, before the property damage occurs. How do we measure dollar savings on losses which have never occurred? Our new measures enable us to engage in true accident prevention work by informing us about problems which have the *potential* for producing future loss, but which, by chance, have not yet resulted in these dollar losses. Assuming we correct the problems at the *loss-potential* stage, we will have few, if any, dollar losses to measure. Of course, one procedure we might use to remind managers of the value of *loss-potential* prevention activity is to set up periodically a controlled experiment in which we measure and control our accident problems at the *loss-potential* stage for one plant or department, and for another similar plant or department do nothing in the way of accident prevention activity during the same time period. Here we have set up an experimental and a control group and we can apply statistical tests to determine the significance of the difference between the two groups in terms of the resulting total accident losses. A less desirable although often used approach is the comparison of cost data before and after the introduction of a set of accident countermeasures. The fallacy in this approach is the assumption of causality from correlation. We simply cannot conclude that because costs or injuries were reduced after the introduction of a countermeasure, the factors which preceded this reduction were causally related to it. Any number of intervening variables may, in fact, have had a controlling influence on the result.

2. *Public responsibility* is another motivating factor for management. Managers have a responsibility to the public for their products and services.

a. For the producer of goods, his product should perform as advertised or according to reasonable expectations. If companies get too far out of line in their advertising claims or in the performance capability claims for their products, laws are passed and controls are introduced to bring things back in line for the public welfare. Most reputable companies feel obligated to replace or repair defective products. Laws now protect the consumer in many areas.



b. Social pressure was one of the major influences which resulted in the passage of workmen's compensation laws in the states. It exerts a strong influence on many managers. When management as a whole chooses to ignore organized social pressure, laws and their enforcement soon follow.

c. Public responsibility is, of course, related to public acceptance and ultimately to profits. If managers are not responsive to the public's needs, they may find themselves out of business.

3. *Internal personnel development responsibilities*—human relations and training within the organization. This responsibility relates to morale, production quality and quantity, motivation, job satisfaction, and general standards of operation.

4. *Employee attitude* is also related to morale and general employee behavior. Employees need to feel they are being treated fairly. When they don't feel this way, they often exert collective influence on the manager to provide certain employee benefits, including a safe work environment.

5. *Market position*—relative position of the company among competitors in the field, both foreign and domestic, serves as a motivating force for managers.

6. *Productivity*—Output per man-hour, percent of profit return on investment, the ratio of what goes out to what is put into the system—these are some of the measures of productivity. Managers strive for an effective balance in the use of men, material, and capital. Productivity relates to production quantity and quality and also directly influences profits.

7. *Technological leadership*—This means not only meeting customers' present needs and desires, but developing new products and refinements of old products so as to influence and satisfy the future desires of the consumer. Progressive managers are strongly motivated to avoid technological obsolescence in the market they serve.

8. *Balance between long-range and short-range objectives and goals.*

a. *Goal:* short-range plan of accomplishment.

b. *Objective:* long-range plan, which may consist of a series of milestones or short-range goals.

c. In planning and organizing, managers identify long-range objectives and then pick out short-range goals or milestones which will allow the long-range objectives to be reached in a systematic manner within acceptable time limits. They then apply the integration principle and measure progress toward accomplishing these goals and objectives.

## Tools of Management

The many tools of the manager such as planning, organizing, coordinating, controlling, integrating, and communicating are important to the safety professional. A thorough understanding of how management functions and what factors are important to a manager's success are vital to the safety professional's success. At the same time, the safety professional must realize that he has no real

managing authority in the line structure of the organization and that true accident prevention accomplishment can only come about through direct participation by the persons who occupy managerial positions (see Figure 2). He will probably function most effectively when he reports to the top management level in the organization structure. Line direction of the safety program should originate from this top management level.

The authority of the safety professional is that of knowledge and the soundness of the information he provides. His success is a function of his ability to gather well-documented facts based on valid measures of safety effectiveness. His efforts must largely be directed toward providing line management with accurate decision-making information. The safety professional is a resource person who should possess as a basic skill the ability to perceive and measure hazardous conditions and injury potential activities which others without his orientation may overlook. His primary justification for existence rests with his ability to perceive problems, measure loss potential, and deliver sound information accompanied by action alternatives so that managers can properly weigh the safety aspects of their management decisions.

Managers play a major role in the achievement of an organization's safety goals and objectives by means of the leadership climate they establish and maintain at all levels of supervision. The starting point for establishing a favorable safety climate is the prescription and implementation of management safety policies which define responsibility for accident loss control at various management levels. The attitude toward accident prevention on the part of top management is invariably reflected in the attitude of middle management and the first-line supervisory force, which in turn affects the safety attitude and performance of individuals at the worker level. The final link in the management chain is the supervisor's expressed and demonstrated interest in safety and the value he places on safe practices and safe environments as an inherent component of production performance.

## Close Executive Attention Required

Controlling work injuries and work environments requires close executive attention. The details for implementing an accident countermeasure and loss control program may be assigned to various management levels, but the responsibility for establishing a basic policy cannot be delegated. An organization which attempts to control accidents without a definite guiding policy will find itself continually engaged in "fire-fighting" and reacting to crisis situations. A set of policies should be established which will lead to a systematic plan for appropriate managerial action on a sustaining basis.

Policy making must start at the top of the managerial hierarchy. Many managers mistakenly believe that the verbalization of support for a policy is all that is necessary. They simply send a memo to subordinates stating that top management wishes a program to be implemented. This, obviously, does not insure compliance. Verbalized policy support must be reinforced by the subordinate

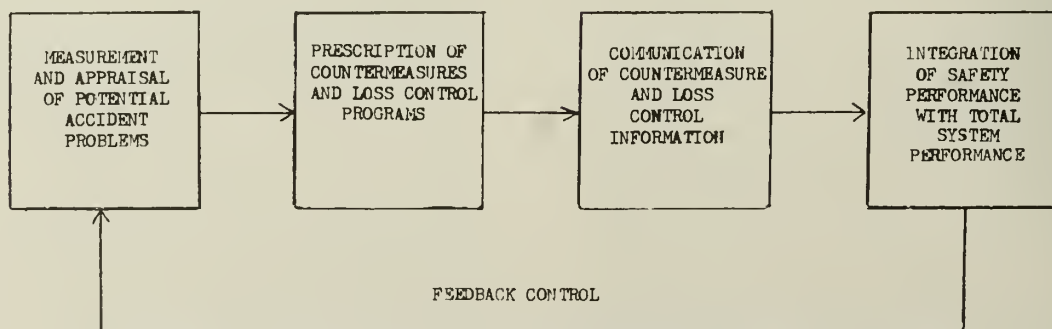


FIGURE 3. FUNCTIONS OF THE SAFETY PROFESSIONAL

manager's and line worker's individual perception of top management action and behavior in terms that are meaningful at these levels. Various individuals affected by the policy will ask such questions as: "Does he really mean it?" "Does this apply to me or am I an exception?" "The words sound fine, but how can I apply them in my particular situation?"

The best evidence of management support is use of the safety policy by top management, middle management, and first-line supervisors as *other* rules, orders, and directives are formulated and transmitted to various lower levels for implementation. Follow-up action which says, in effect, "yes, I really mean it," will provide considerable reinforcement for the policy.

Middle management and first-line supervisor participation in policy-making; involvement in formulating goals and objectives for policy implementation; discussions of policies, goals, and objectives with subordinates; and involvement in producing feedback of information about the actual implementation results will have substantially greater effect on subordinates than simply saying "this policy has the support of top management and we must comply with it." My point is that policy must be supported with "deeds" as well as "words."

Feedback which evaluates the implementation effectiveness of the policy, goals, and objectives seems to be a fundamental requirement for behavior change. Furthermore, the quality and frequency of feedback demanded by higher management levels is often interpreted by the subordinate as a measure of the superior's real interest in the safety program.

### A Major Obstacle

A major obstacle to the success of an organization's safety efforts is a general misunderstanding concerning the safety professional's job and the accident prevention responsibilities of line managers. The respective roles of the safety professional and line managers are often confused and obscure. As a result, the safety professional is frequently called upon to perform certain functions which may conflict with the responsibility and authority of upper and middle line managers and first-line supervisors. He is frequently held *responsible* for accident control and made *accountable* for accident losses without being given the *authority* needed to control the individuals responsible for accident involvement and the environments within which they work.

Certain generally recognized principles of management have a direct bearing on these problems. The acceptance of their validity provides justification for identifying certain functions with the safety professional and for excluding other functions from his assigned responsibilities. These principles are as follows:

1. Efficient managerial practice requires a distinct separation between line and staff functions.
2. A man cannot serve two masters well. A member of an enterprise should normally have only one boss. Dual subordination should be avoided.
3. No one should be assigned responsibility for a task without the necessary authority to accomplish it.
4. Accountability should accompany responsibility and authority in the performance of line functions.
5. The integrity of the line channel of command should be maintained.
6. The primary function of staff is to assist the operating line to do a more effective job. This function encompasses part of all of the following duties:
  - a. Assembling facts
  - b. Summarizing and interpreting data
  - c. Recommending courses of action.
  - d. Discussing proposed plans with various executives and obtaining their concurrence or reasons for objection.
  - e. Preparing written orders and other documents necessary to put a plan into action for submission to line authority
  - f. Explaining and interpreting the technical aspects of orders that have been issued
  - g. Appraising actual operations to ascertain if the orders issued are achieving desired results

h. Developing new plans on the basis of operating experience and anticipated conditions

i. Promoting an exchange of information among operating officials to increase voluntary co-ordination

j. Developing enthusiasm among operating people for established policies and programs

Generally, staff activities should be limited to these duties.

Assuming these principles of management practice have been accepted, we can then establish certain functions as belonging to the staff safety professional and, of equal importance, identify other functions which should be excluded from his assigned task. The major functions of the safety professional can be grouped under four major operational areas (see Figure 3):

1. Measurement and appraisal of potential accident problems within the system

2. Prescription of accident countermeasures and loss control programs

3. Communication of accident countermeasures and loss control information

4. Integration of safety performance with total system performance

Details concerning the specific functions listed under each of these operational areas provide a definition of the responsibilities of the practicing safety professional. For our purposes in considering the problems of management for accident control, of equal concern are the functions which the safety professional should *not* perform.

### The Question of Responsibility

According to the generally accepted management principles previously described, members of line management should be held *responsible* for accidents and their associative losses, just as they are held responsible for other aspects of the organization's operations such as maintaining production quality and quantity, controlling costs, meeting time schedules, and utilizing efficiently the available material and personnel resources to accomplish the organization's goals and objectives. Line managers should be given the *authority* to establish controls over the behavioral and environmental malfunctions which contribute to accident problems. Furthermore, they should be held *accountable* for the consequences of accidents among the personnel and within the environments under their supervision, just as they are charged with accountability for failure to meet other established performance and production standards.

We can now summarize the tasks the safety professional should *not* perform as follows:

1. The safety professional does not stop accidents. The causal factors associated with environmental and behavioral malfunctions which underlie all accident situations are under the direct control of line managers and only they have the responsibility and authority needed to bring about their improvement.

2. The safety professional should not attempt to produce a direct change in worker behavior either by ordering the change himself or by directly attempting to persuade the worker to change his behavior. Responsibility for the control of worker behavior rests with the line supervisor. Under the management concept that each person should have only one "boss," the safety professional should avoid direct intervention between the supervisor and his subordinates and he should not attempt to influence directly the behavior of line workers.

3. The safety professional should not initiate orders for changes in existing environmental conditions, revisions in manufacturing processes, or modifications in equipment and machinery. The line supervisor, being responsible for working conditions, should initiate these actions.

4. The safety professional should not be held accountable for accidents and their consequences, except where they result from basic technical defects within the safety system. Line managers should be held accountable for accident-related behavioral and environmental problems and their associative losses just as they are held accountable for other defects in the production process.



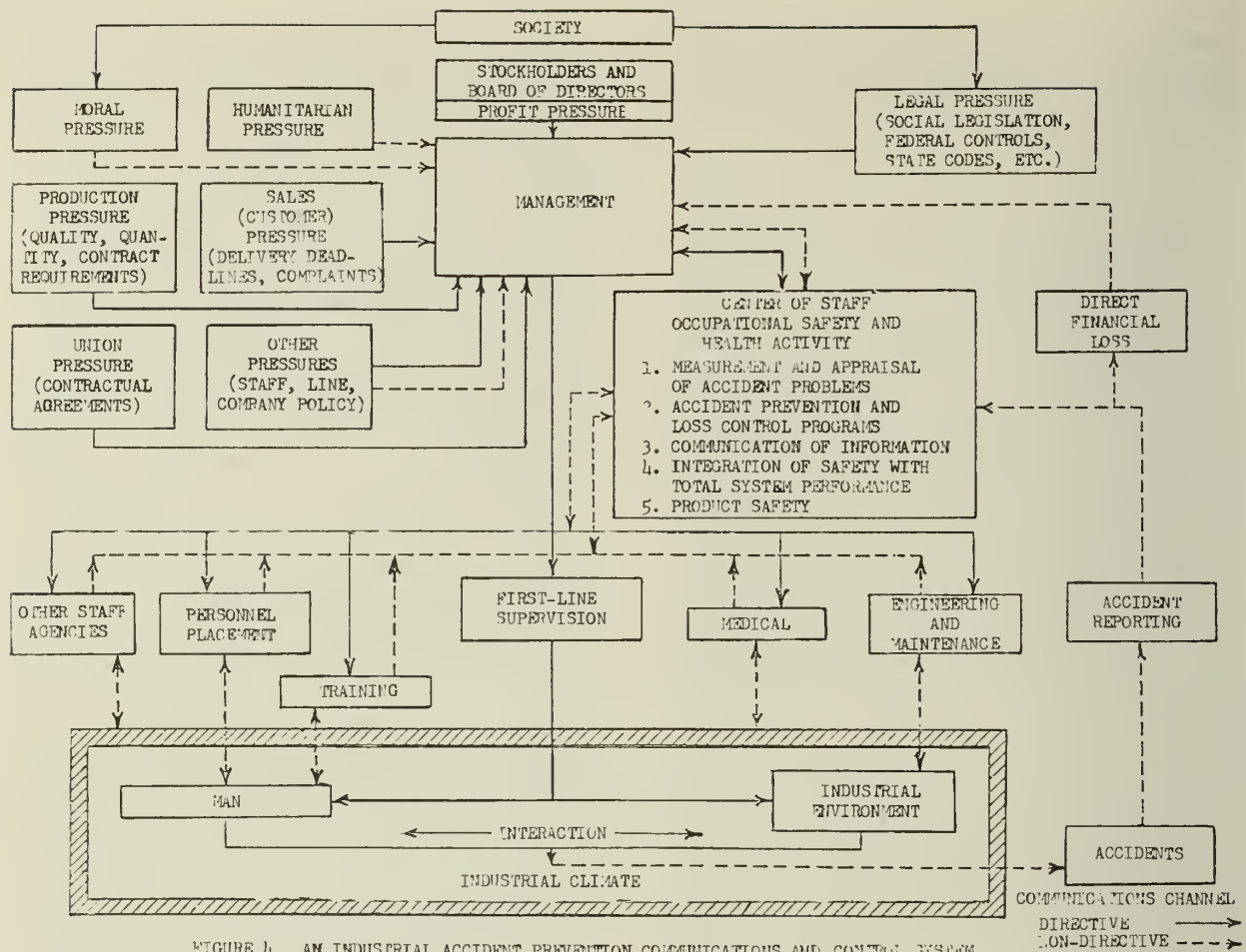


FIGURE 4. AN INDUSTRIAL ACCIDENT PREVENTION COMMUNICATIONS AND CONTROL SYSTEM

5. The safety professional should not attempt to give directive guidance to lower level line activities except for purposes of supervisory development in specialized accident and loss control techniques and in special instances where problems of a highly technical nature are involved. Directives concerning safety should be transmitted through the same line channels used to transmit directives concerning product quality, product quantity, and other aspects of production operations.

6. The safety professional should not be charged with enforcing safety rules and regulations. The task of enforcing all company rules and regulations rests with line supervisors and managers. The task of maintaining a day-to-day level of employee discipline conducive to the efficient performance of work assignments rests primarily with the first-line supervisor.

What tasks should the safety professional be expected to perform? Perhaps the functions of the safety professional and the integration of accident control responsibilities into management operations can be synthesized into a more meaningful whole with the aid of a symbolic schematic or model representing a portion of an industrial system (see Figure 4). The boxes represent major components within the system, while the lines and directional arrows represent directive and non-directive communications channels. The system functions as follows:

1. Management receives staff accident prevention and loss control program guidance from the Center of Staff Occupational Safety and Health Activity.

2. Management also receives a number of pressures which influence the decision-making process. These pressures may come from such sources as stockholders

and a board of directors interested in profits, federal and state laws relating to the operations concerned, union agreements, company policies exerting pressures on lower management levels, the requirements of production and sales, moral pressures, influence by social groups, and the manager's own humanitarian feelings.

3. Management integrates all input information, resolves the input forces of varying magnitude and direction, and makes a decision to implement or reject the guidance received from the Center of Staff Occupational Safety and Health Activity. In addition to these pressures, management decisions are influenced by such factors as the manager's own problem perception ability; his personal prejudices, attitudes, and interests; his willingness and ability to make decisions; his educational and experience background; and the persuasive ability of his advisors.

4. When a decision is made to adopt a safety recommendation, implementing directives are injected into the line communications system and transmitted down the managerial hierarchy to the execution level.

5. The first-line supervisor, operating at the lowest managerial level, translates the directives into action by executing a change in the environment, in the process, or in worker behavior within his area of responsibility.

6. Other staff agencies such as the personnel, training, medical, and engineering departments, each have certain responsibilities for providing technical guidance to line management.

7. The safety directive is implemented along with all other operational directives. Taken collectively, the operation plans, the actions of the first-line supervisor, and the direct influences of other staff agencies produce an

industrial climate (represented by the cross-hatched box) within which man, machinery, equipment, and environments interact to accomplish the mission of the organization.

8. The Center of Staff Occupational Safety and Health Activity evaluates the quality and effectiveness of the safety directives in terms of their influence on the system.

9. The safety professional provides technical guidance for the various managerial levels and for other staff agencies as needed. He also receives direct feedback information from line and staff personnel and from the environment.

10. People, machinery, equipment, and environments interact within the industrial climate to produce errors and malfunctions in the form of unsafe conditions and unsafe behaviors. These problems often erupt in the form of accidents as previously defined.

11. The safety professional applies his special measurement techniques and appraises the safety state of the system. Most of his efforts are directed toward appraising the accident loss potential of the system, as opposed to conducting after-the-fact analyses of injuries or property damaging accidents. Loss-type accidents receive attention, of course, but they constitute a relatively minor portion of the total accident problem and thus comprise only a relatively small portion of the total information received by him.

12. The Center of Staff Occupational Safety and Health Activity receives feedback information concerning the safety state of the system and the quality and effectiveness of the accident prevention program activity.

13. At this point, the safety professional performs the following functions:

a. Analyzes all accident information and considers evidence of error-likely situations, environmental and behavioral malfunctions, and loss-potential problems from all available sources.

b. Identifies problem areas in need of attention, using his specialized knowledge and problem perception capability. This task produces a hierarchy of problems which can be ranked in order of probable loss potential to permit the most cost-effective allocation of finite resources.

c. Develops or selects countermeasures designed to achieve the objectives of accident loss control.

d. Prescribes appropriate accident countermeasures and loss control programs and/or engineering design revisions applicable to the environment, machinery, equipment, or process; or to the humans interacting with these system components.

e. Prepares implementing directives and/or design modifications which will lead to problem solutions.

f. Communicates accident countermeasure and loss control information to members of line management for use in the managerial decision-making process.

g. Persuades members of line management to adopt various accident countermeasures, process modifications, and engineering designs with the ultimate objective of integrating safety into all managerial and operational functions.

14. Management directly influences the effectiveness of the Center of Staff Occupational Safety and Health Activity by its willingness to:

a. Allocate sufficient money, personnel, and facilities for the effective performance of occupational safety and health functions.

b. Maintain a stable, well-qualified staff of safety professionals.

c. Accept the recommendations of the staff safety professionals.

d. Implement the accident countermeasure and loss control directives by giving them proper emphasis as they are communicated downward.

e. Enforce safety directives with the same intensity of effort and enthusiasm given to the enforcement of operational directives involving production quantity and quality and other vital functions of the organization.

15. The feedback loop is closed when management receives safety decision-making information from the

Center of Staff Occupational Safety and Health Activity.

16. In addition to his concern for general loss prevention activities, the safety professional performs a product engineering function by designing the safety features of materials, equipment, and other product items. He also performs general system safety analyses on the product and on the production process as required.

This schematic is a *symbolic model* presented as a *conceptual representation* of the occupational safety and health function in a systems context.

## Conclusions

The safety professional serves as a unifying force in bringing together the knowledge and talents of various scientific, behavioral, managerial, and engineering disciplines, and in developing a means for integrating them into a cohesive team to assist line managers so that these managers may properly consider relevant safety factors when making management decisions. He is concerned with the development, improvement, coordination, and evaluation of integrated systems of men, materials, and equipment with the objective of optimizing the safety effectiveness of these systems. In carrying out these tasks, the safety professional draws upon his specialized knowledge and skill in the physical and social sciences and applies the principles and methods of engineering measurement, analysis, and control, to specify, predict, and evaluate the safety aspects of systems operations.

A dramatic change is taking place in the techniques involved in management for accident control. In the future, managers will be looking to the safety professional more and more as an individual who can step back far enough from day-to-day operations to observe objectively the entire system by which the organization is run, rather than as a specialist intent on examining the safety aspects alone. His concern with before-the-fact problem analysis, his contributions to product development, and his use of more objective techniques of systems performance appraisal will make him a vital member of the management staff as he teams with others to stress the scientific, the economic, and the management aspects of loss prevention programs and their contributions to the critical functions of total system performance.

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## SAFETY PERFORMANCE RECORD

CUMULATIVE QUARTERLY REPORT  
GOVERNMENT FORCES

2nd QUARTER, 1972

PERIOD FROM JANUARY 1, 1972 THROUGH June 30, 1972

REPORTING OFFICE	NUMBER OF EMPLOYEES	MAN HOURS	DISABLING INJURIES		DAYS LOST	FREQUENCY RATE	SEVERITY RATE
		CUMULATIVE THIS YEAR	CUMULATIVE THIS YEAR	FATAL *	CUMULATIVE THIS YEAR	CUMULATIVE THIS YEAR	CUMULATIVE THIS YEAR
Washington Office	227	247,254					
Denver Office - F&R Center	1,248	1,275,782					
PACIFIC NORTHWEST REGION							
Boise Regional Office	190	171,038	1		2	5.6	12
Central Snake Project	36	33,222	1		2	30.1	60
Chief Joseph Dam Project	28	27,108					
Columbia Basin Project	241	238,808	1		3	4.2	13
East Greenacres Project Office	14	8,350					
Grand Coulee Dam Operations Office	306	291,029					
Green Springs Powerplant	2	2,139					
Humbly Horse Project	40	36,599					
Lower Columbia Planning Office	33	33,539					
McKay Dam	1	1,016					
Minidoka Projects	63	66,168					
Snake River Planning Office	34	36,011					
Teton Basin Project	48	23,291					
Third Powerplant Construction Office	233	211,980					
Tualatin Project	28	22,193					
Upper Columbia Planning Office	32	30,184					
Yakima Project	30	27,472					
Totals & Averages	1,359	1,270,167	3		7	2.4	6
MID-PACIFIC REGION							
Sacramento Regional Office	472	530,499					
Regional Drill Crew	21	23,100	1		6	43.3	259
Auburn-Polson South Unit CVP Construction Office	206	219,760					
Cachuma Operations Field Branch	2	2,068					
Central Coast Development Field Branch	3	2,880					
Folsom Field Division	80	78,040					
Fresno CVP Construction Office	212	188,579					
Fresno Field Division	138	136,392					
Klamath Project Office	18	16,525					
Lahontan Basin Projects Office	21	20,752					
Sacramento Valley CVP Construction Office	129	94,748					
San Luis Unit CVP Construction Office	17	31,370					
Shasta Field Division	137	137,216					
Solano Operations Field Branch	2	2,048					
Tracy Field Division	159	163,107	1		33	6.1	202
Totals & Averages	1,617	1,647,064	2		39	1.2	24
LOWER COLORADO REGION							
Boulder City Regional Office	225	194,880					
Arizona Projects Office	121	96,066					
Boulder Canyon Project	163	155,307					
Lower Colorado River Project	125	118,310					
Parker-Davis Project	298	321,087					
Southern California Planning Office	16	15,336					
Yuma Projects Office	132	119,600					
Totals & Averages	1,080	1,020,586					
UPPER COLORADO REGION							
Salt Lake City Regional Office	209	217,785					
Central Utah Projects	210	207,770					
CSP Power Operations Office	270	238,905	1		13	4.2	54
Durango Projects Office	70	51,044					
Grand Junction Projects Office	118	114,479					
Logan Development Office	5	5,200					
Lyman Project	11	7,961					
Upper Green River	13	15,864					
Totals & Averages	906	859,008	1		13	1.2	15
SOUTHWEST REGION							
Amarillo Regional Office	116	101,915					
Albuquerque Development Office	29	28,541					
Austin Development Office	23	33,752					
Loan Program Projects Office	1	1,040					
Middle Rio Grande Project	204	227,702					
Mountain Park Project	50	43,696					
Navajo Project	114	93,302	3		40	32.2	429
Oklahoma City Development Office	16	14,912					
Palmetto Bend Project	37	12,432					
Pecos River Office	18	15,824					
Rio Grande Project	183	176,594	1		4	5.7	23
San Juan-Chama Project	23	21,344					
Totals & Averages	814	771,061	4		44	5.2	57
CONSOLIDATED TOTALS							
TOTALS LAST YEAR (1971)							

\*FATALITIES INCLUDED IN TOTAL DISABLING



## SAFETY PERFORMANCE RECORD

CUMULATIVE QUARTERLY REPORT

GOVERNMENT FORCES

2nd QUARTER, 1972

PERIOD FROM JANUARY 1, 1972-- THROUGH-- June 30, 1972--

REPORTING OFFICE	NUMBER OF EMPLOYEES	MAN HOURS	DISABLING INJURIES		DAYS LOST	FREQUENCY RATE	SEVERITY RATE
		CUMULATIVE THIS YEAR	CUMULATIVE THIS YEAR	FATAL*	CUMULATIVE THIS YEAR	CUMULATIVE THIS YEAR	CUMULATIVE THIS YEAR
<b>UPPER MISSOURI REGION</b>							
Billings Regional Office	164	156,480					
Geology and Drill Crews	8	8,807					
Canyon Ferry Project	22	18,326	1		2	54.6	109
Fort Peck Project	41	36,313					
Missouri-Dahe Projects	209	184,160					
Missouri-Souris Projects	352	349,487	1		6	2.9	17
Power System Operations Office	50	51,680					
Riverton Project	5	4,941					
Upper Missouri Projects	67	60,162	1		25	16.6	414
Yellowtail Project Office	41	33,647					
Totals & Averages	959	904,203	3		33	3.3	36
<b>LOWER MISSOURI REGION</b>							
Denver Regional Office	190	192,336					
Cheyenne Construction Office	22	7,440					
Fryingpan-Arkansas Project	204	185,320					
Kansas River Projects	93	94,776					
Niobrara-Lower Platte Development Office	44	37,512					
North Platte River Projects	215	226,640					
South Platte River Projects	155	159,736					
Totals & Averages	923	903,760					
<b>CONSOLIDATED TOTALS</b>							
	9,133	8,898,865	13		136	1.5	15
<b>TOTALS LAST YEAR (1971)</b>							
	8,645	17,781,946	31	1	6,653	1.7	374
<b>* FATALITIES INCLUDED IN TOTAL DISABLING</b>							
<b>JOB CORPS CONSERVATION CENTERS</b>							
<b>Columbia Basin Job Corps Center</b>							
Staff	69	140,624	2		47	14.2	334
Corpsmen	214	579,696					
<b>Marsing Job Corps Center</b>							
Staff	59	108,144					
Corpsmen	167	490,704	1		75	2.0	153
<b>Callahan Job Corps Center</b>							
Staff	57	58,656					
VISTA	1	3,534					
Corpsmen	137	415,968					
<b>Weber Basin Job Corps Center</b>							
Staff	65	68,800					
VISTA	1	1,456					
Corpsmen	223	652,624					
<b>TOTAL STAFF</b>							
	250	376,224	2		47	5.3	125
<b>TOTAL VISTA</b>							
	2	4,990					
<b>TOTAL CORPSMEN</b>							
	741	2,138,992	1		75	0.5	35
<b>CONSOLIDATED TOTALS</b>							
	993	2,520,206	3		122	1.2	48
<b>TOTALS LAST YEAR (1971)</b>							
	945	5,004,546	3		42	0.6	8

\*FATALITIES INCLUDED IN TOTAL DISABLING

# SAFETY PERFORMANCE RECORD

## CUMULATIVE QUARTERLY REPORT

### CONTRACTOR FORCES

2nd QUARTER, 1972

PERIOD FROM JANUARY 1, 1972 THROUGH June 30, 1972

REPORTING OFFICE	NUMBER OF EMPLOYEES	MAN HOURS	DISABLING INJURIES		DAYS LOST	FREQUENCY RATE	SEVERITY RATE
		CUMULATIVE THIS YEAR	CUMULATIVE THIS YEAR	FATAL #	CUMULATIVE THIS YEAR	CUMULATIVE THIS YEAR	CUMULATIVE THIS YEAR
PACIFIC NORTHWEST REGION							
Boise Regional Office		881					
Central Snake Projects	2	150					
Chief Joseph Dam Project	28	11,947					
Columbia Basin Project	92	77,971	7	1	6,044	89.8	77,517
East Greenacres Project Office	4	865					
Teton Basin Project	358	147,981	1		22	6.8	149
Third Powerplant Construction Office	1,393	1,145,618	3	1	6,036	2.6	5,269
Tualatin Project	4	2,995					
Yakima Project	8	184					
Totals & Averages	1,889	1,388,592	11	2	12,102	7.9	8,715
MID-PACIFIC REGION							
Auburn-Folsom South Unit CVP Construction Office	562	345,136	5	1	6,146	14.5	17,807
Fresno CVP Construction Office	215	130,660	2		110	15.1	842
Folsom Field Division		1,920					
Sacramento Valley CVP Construction Office	96	9,317					
San Luis Unit CVP Construction Office		21,797					
Tracy Field Division	5	5,580					
Totals & Averages	878	514,410	7	1	6,256	13.6	12,162
LOWER COLORADO REGION							
Boulder City Regional Office	24	3,222					
Arizona Projects Office	18	1,803					
Boulder Canyon Project		2,588					
Lower Colorado River Project		1,200					
Parker-Davis Project	19	12,691	1		15	78.9	1,181
Yuma Projects Office		3,053					
Totals & Averages	61	24,557	1		15	40.7	611
UPPER COLORADO REGION							
Salt Lake City Regional Office	14	11,915					
Central Utah Projects Office	303	207,196	3		13	14.5	63
Grand Junction Projects Office	35	20,657	1		6	48.4	290
Totals & Averages	352	241,768	4		19	16.5	79
SOUTHWEST REGION							
Mountain Park Project	3	6,038					
Navajo Project	217	167,054	5		149	29.9	892
Palmetto Bend Project	8	1,407					
San Juan-Chama Project	14	5,069					
Totals & Averages	242	179,568	5		149	27.8	830
UPPER MISSOURI REGION							
Missouri-Oahu Projects	26	16,502					
Missouri-Souris Projects	283	107,311	1		3	9.3	28
Riverton Project	2	1,254					
Upper Missouri Projects	39	16,331					
Totals & Averages	350	141,398	1		3	7.1	21
LOWER MISSOURI REGION							
Cheyenne Construction Office	68	11,624					
Fryingpan-Arkansas Project	259	225,677	7		56	31.0	248
Kansas River Projects	40	9,559					
North Platte River Projects		11,250					
Totals & Averages	367	258,110	7		56	27.1	217
CONSOLIDATED TOTALS							
	4,139	2,748,403	36	3	18,600	13.1	6,768
TOTALS LAST YEAR (1970)							
	2,946	6,780,040	57		1,599	8.4	236

\* FATALITIES INCLUDED IN TOTAL DISABLING



# SAFETY FIRST

## boating's golden rule

### OBSERVE THESE SAFETY RULES—

- 1 • Know your boat
  - 2 • Don't overload
  - 3 • Keep a good lookout
  - 4 • Operate at safe speeds
  - 5 • Respect the weather
  - 6 • Take sufficient fuel
  - 7 • Keep your boat in shape
  - 8 • Carry necessary equipment
  - 9 • Secure your boat properly
  - 10 • Obey the law
- You are responsible for your wash and wake.
  - Reckless operation is punishable by fine and imprisonment.
  - Boats in your "Danger Zone" have right-of-way and should hold course and speed. Learn and exchange proper whistle signals to avoid misunderstanding.
  - An overtaking boat is the burdened vessel.
  - Sailboats have right-of-way except when overtaking. Pass them wide to leeward.
  - Large vessels and tows are not quickly maneuverable. Keep clear—give them room.



**Be courteous and careful at all times!**



# OCCUPATIONAL SAFETY AND HEALTH ACT REGULATION

## FLAMMABLE LIQUID STORAGE AND TRANSFER

### 1910.106 Flammable and combustible liquids

(b) *Design, construction, and capacity of storage cabinets*  
(i) *Maximum capacity.* Not more than 60 gallons of flammable or 120 gallons of combustible liquids may be stored in a storage cabinet.

*Fire resistance.* Storage cabinets shall be designed and constructed to limit the internal temperature to not more than 25° F. when subjected to a 10-minute fire test using the standard time-temperature curve as set forth in Standard Methods of Fire Tests of Building Construction and Materials, NFPA 251-1969. All joints and seams shall remain tight and the door shall remain securely closed during the fire test. Cabinets shall be labeled in conspicuous lettering, "Flammable — Keep Fire Away."

(ii) *Metal cabinets constructed in the following manner shall be deemed to be in compliance.* The bottom, top, door, and sides of cabinet shall be at least No.18 gauge sheet iron and double walled with 1½-inch air space. Joints shall be riveted, welded or made tight by some equally effective means. The door shall be provided with a three-point lock, and the door sill shall be raised at least 2 inches above the bottom of the cabinet.

(iii) *Wooden cabinets constructed in the following manner shall be deemed in compliance.* The bottom, sides, and top shall be constructed of an approved grade of plywood at least 1 inch in thickness, which shall not break down or delaminate under fire conditions. All joints shall be rabbetted and shall be fastened in two directions with flathead wood screws. . . . .

### Visual Product Reference



# OBEY THE LAW !



# *Reclamation* **SAFETY NEWS**

**THIRD QUARTER 1972**



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UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF RECLAMATION  
ENGINEERING AND RESEARCH CENTER

UNIVERSITY OF ILLINOIS  
AT URBANA-CHAMPAIGN

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## TABLES

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Front Cover Photo: Sign at Glen Canyon Powerplant, Page, Arizona, which is typical of the manner of identifying and posting locations in the Bureau of Reclamation where high noise levels are generated. Where an area has been so identified, employees are informed of the hazard and proper protective measures initiated (exposure time limits set or noise attenuation devices provided) until further analysis can determine if sound level reductions can be obtained through acoustical or engineering procedures. Photo P557-D-72390

SAFETY NEWS is published quarterly by the Engineering and Research Center, Division of Safety, Bureau of Reclamation, P.O. Box 25007, Denver Federal Center, Denver, Colorado 80225, in the interest of accident prevention.

# BUREAU SAFETY PERFORMANCE

## 1972 CUMULATIVE ACCIDENT RECORD

January 1 - September 30, 1972

### A. GOVERNMENT FORCES

<u>Region</u>	<u>Injury index*</u>	<u>Frequency rate</u>	<u>Severity rate</u>	<u>Vehicle accident rate*</u>
Pacific Northwest	0.5	3.6	15	3.7
Mid-Pacific	0.4	1.6	24	2.3
Lower Colorado	0.01	0.7	1	2.2
Upper Colorado	0.3	2.3	12	3.5
Southwest	2.1	3.3	64	2.2
Upper Missouri	0.5	2.2	24	3.1
Lower Missouri	<u>0.0</u>	<u>0.0</u>	<u>0</u>	<u>4.9</u>
Totals to Date	0.3	1.6	16	3.1
<hr/>				
Totals 1971	6.4	1.7	374	3.3

\*Injury index is equal to frequency rate times severity rate divided by 100.  
Vehicle accident rate is the number of accidents per million miles driven.

### B. CONTRACTOR FORCES

<u>Region</u>	<u>Injury index</u>	<u>Frequency rate</u>	<u>Severity rate</u>	<u>Fatal injuries</u>
Pacific Northwest	321.7	6.3	5,107	2
Mid-Pacific	767.7	12.1	6,345	1
Lower Colorado	6,414.5	167.0	3,841	0
Upper Colorado	22.7	12.8	177	0
Southwest	391.0	34.6	1,130	0
Upper Missouri	9.1	5.4	169	0
Lower Missouri	<u>51.6</u>	<u>21.5</u>	<u>240</u>	<u>0</u>
Totals to Date	474.6	12.5	3,797	3
<hr/>				
Totals 1971	19.8	8.4	236	0

### C. RECLAMATION CIVILIAN CONSERVATION CENTERS

Frequency rate	1.1
Severity rate	34
Vehicle accident rate	8.6



## LOST TIME ACCIDENT ANALYSIS

Government Forces - 1972  
Third Quarter

Cumulative to Date:  
September 30, 1972

### A. ACCIDENT CLASSIFICATION

<u>Description</u>	<u>No.</u>	<u>Days lost</u>
Lifting	3	17
Vehicles	5*	121*
Striking against	1	1
Struck by objects	3	17
Falls	4	47
Caught in or between	4	23
Slip or twist	3**	36**
Inhalation	<u>2</u>	<u>5</u>
Totals	25	267

\* Includes two Job Corps staff members with 47 days lost time.

\*\* Includes one Job Corps staff member with 2 days lost time.

### B. SERIOUS ACCIDENTS - CONTRACTOR EMPLOYEES

A contractor employee in the Mid-Pacific Region was fatally injured when struck by falling rock in a tunnel.

A contractor employee in the Pacific Northwest Region was fatally injured when the boom of the drill rig he was operating contacted an overhead powerline.

A contractor employee in the Pacific Northwest Region was fatally injured when a cantilever form anchor system failed, and the form, concrete, and employee fell approximately 180 feet down the face of the dam.

### C. OPERATIONAL SUMMARY

<u>Operation</u>	<u>Man-hours</u>	<u>No. of accidents</u>	<u>Days lost</u>	<u>Frequency rate</u>	<u>Severity rate</u>
Administration, Clerical and Design	5, 883, 070	2	17	0.3	3
Construction	2, 238, 528	6	86	2.7	38
Investigation	1, 156, 723	2	8	1.7	7
Power O&M	2, 756, 935	7	24	2.5	9
Irrigation O&M	<u>1, 459, 087</u>	<u>5</u>	<u>83</u>	<u>3.4</u>	<u>57</u>
Totals	13, 494, 343	22	218	1.6	16

\* \* \* \* \*

# SAFETY AWARDS

## RECLAMATION'S LOWER MISSOURI REGION WINS SAFETY AWARD

The Bureau of Reclamation's Lower Missouri Region (formerly Region 7) with headquarters in Denver, Colorado, has won an Award of Merit, second highest recognition of the National Safety Council, for an outstanding safety record.

Ralph L. Rickenbaugh (below, right), President of the Colorado Safety Association, presented the award to James M. Ingles (center), Director of the Lower Missouri Region, as Howard S. Latham, Reclamation's former Chief Safety Engineer looks on.

The citation noted that only three lost time accidents were recorded in 1971 among the Region's 864 employees in Colorado, Wyoming, Kansas and Nebraska. This represents but 1.7 disabling accidents per million man-hours worked. In contrast, the national industrial average was 13.2 disabling injuries per million man-hours worked. Mr. Ingles especially recognized George D. Winans, Regional Safety Engineer, paying tribute to his accomplishments in regional safety procedures and in the direction of an aggressive safety educational and training program.



Photo PX-D-72393

DEPARTMENT OF THE INTERIOR  
CERTIFICATE OF SAFETY ACHIEVEMENT



A. B. Watts, Regional Supervisor of Power, Lower Missouri Region (above, right) presents a Department of the Interior Certificate of Safety Achievement Award to James E. Stokes, Project Manager, South Platte River Projects, Loveland, Colorado. Clyde Reikofski, Chief, Power O&M Division, South Platte River Projects and Chairman of the Project Safety Committee, looks on with approval. The award was in recognition of South Platte River Projects working 560,460 man-hours without a disabling injury from November 4, 1970, to April 30, 1972. This fine safety record is continuing and the employees of the South Platte River Projects have now accomplished over 700,000 man-hours exposure without a lost time injury. Photo P245-713-5260NA

RECLAMATION'S CONSTRUCTION SAFETY AWARD  
PRESENTED TO FISHER BROTHERS, INC.

Pictured on the following page at the presentation ceremony at the Sacramento Valley CVP Construction Office are (left to right): E. S. Ensor, Bureau Project Safety Officer; Ron E. Fisher, Vice President, and Walter E. Fisher, President, Fisher Brothers; W. C. Hart, Project Construction Engineer for the Bureau of Reclamation at Willows, California; Bob Avery, General Superintendent for Fisher Brothers, and J. R. Merlino, Office Engineer for the Bureau. The award was presented for the exemplary safety record in completing the job - much of which was working with heavy equipment placing riprap protection along the Sacramento River - without a single disabling injury. The work was completed in less than half the contract time in spite of the fact that the very nature of the work constituted extremely hazardous conditions. Photo P602-200-6288NA







GRANITE CONSTRUCTION COMPANY  
EARNS CONSTRUCTION SAFETY AWARD

E. J. Brannan (below, right), Project Construction Engineer at the Bureau's Fresno CVP Construction Office in California, is shown presenting the Bureau of Reclamation's Construction Safety Award to Donn Sawyer, representing Granite Construction Company, in recognition of the outstanding safety record achieved during construction of Westlands Water District Distribution System Laterals 29, 30, and 31. The contractor completed work on the \$6,228,165 contract without experiencing a single disabling injury. Photo CN805-243-5856NA



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# FROM THE FIELD

Montrose Construction Field Division, Montrose, Colorado - Hydrogen Sulfide Detection: Two tests of gaseous atmosphere were made jointly by a Colorado Bureau of Mines Inspector and the Project Safety Officer to determine requirements for protective breathing apparatus on a drilling contract. The gas, hydrogen sulfide, was detected when bailing the drilled holes at lower elevations, and tests indicated gas in sufficient quantity on one hole to warrant the use of self-contained breathing apparatus by those on the drilling platform. The breathing apparatus was procured from the State of Colorado on a loan basis for the short period required. Tests indicated 200 ppm in the baler discharge area and 10 ppm in the drill operator work area.

Hydrogen sulfide ( $H_2S$ ) characteristics and toxicology: Hydrogen sulfide is a colorless, flammable gas with an offensive odor and an explosive range from 4.3 percent to 46 percent in air by volume. Recommended threshold limit value is 10 parts per million or 15 milligrams per cubic meter of air. Toxic rating is high and may cause death or permanent injury after very short exposure to small quantities.

Low concentrations of from 20 to 150 ppm cause irritation of the eyes; slightly higher concentrations may cause irritation of the upper respiratory tract, and if exposure is prolonged, pulmonary edema may result. With higher concentrations the action of the gas on the nervous system becomes more prominent, and a 30-minute exposure to 500 ppm results in headache, dizziness, excitement, staggering gait, diarrhea and dysuria, sometimes followed by bronchitis. The action on the nervous system is, with small amounts, one of depression; in larger amounts, it stimulates, and with very high amounts the respiratory center is paralyzed. Exposures of 800 to 1,000 ppm may be fatal in 30 minutes, and high concentrations are instantly fatal. With repeated exposures to low concentrations, tearing, pain, and blurred vision are the commonest findings.

CRSP Power Operations Office, Montrose, Colorado - Motor Boat Operator Qualification Course: Seventeen employees of the CRSP Power Operations Office and eight employees from the Montrose Construction Field Division participated in the Motor Boat Qualification Course held at the Power Operations Office given by the U.S. Coast Guard Auxiliary on September 7 and 8, 1972.

## REGIONAL SAFETY MEETING HELD IN BOULDER CITY, NEVADA

A Regional Safety Meeting was recently held in Boulder City, Nevada. Represented from throughout the Region were Project Managers, Operating Office Heads, their safety personnel, and members of the Regional Safety Committee.

Problems pertinent to the field of safety were reviewed and discussed with specific emphasis on the Bureau's four points of Vehicle Safety, Public Safety, Physical Fitness and Noise (Hearing). This is in line with the President's proclamation to "ZERO IN ON SAFETY."

The keynote speaker was Mr. Frank Walsh from the Department of Labor, who gave a discourse on the recently enacted legislation concerning the enforcement of the Occupational Safety and Health Act for Construction, which was very informative.

Pictured on the next page from left to right, first row: Fred Burley, Jr., Lower Colorado River Project; G. H. Johnson, Regional Finance Officer; Dean A. Ellsworth, Lower Colorado River Project; B. J. Wolfenbarger, Regional Supply and Services Officer; R. S. Oram, Lower Colorado River Project; Frank Walsh, Department of Labor; center row: R. D. Gear, Regional Supervisor of Water and Land Operations; C. O. Wamstad, Chief, Design Branch, Division of Design and Construction; H. S. Jerrell, Safety Officer, Parker-Davis Project; R. Lopez, Southern California Planning Office; F. M. Warnick, Assistant Regional Director; J. M. Boyles, Safety Officer, Boulder Canyon Project; F. D. Lord, Project Manager, Boulder Canyon Project; F. J. Lasko, Regional Safety Engineer; rear row: D. J. Seely, Lower Colorado River Project; T. H. Moser, Project Manager, Yuma Projects Office; G. C. Andersen, Regional Personnel Officer; M. K. Fulcher, Regional Planning Officer; R. E. Shunick, Associate Projects Manager, Phoenix Development Office; C. B. McGee, Safety Officer, Phoenix Development Office; R. A. Olson, Division of Power; Kenneth Doering, Safety Officer, Southern California Planning Office; E. M. Hallenbeck, Project Manager, Parker-Davis Project; and Mrs. Mildred Rhoades, Regional Safety Clerk.





Photo PX-D-72394



## WOMEN IN SAFETY

Bureau of Mines First Aid Methods is one of the many continuing safety training programs conducted within the Lower Colorado Region.

In an effort to acquire more trained instructors, it was decided to utilize the services of the Occupational Health Nurses employed by the Boulder Canyon Project (Hoover Dam) and have them become Bureau of Mines Provisional First Aid Instructors.



Above, on the left, is Nurse Melinda Brink who is scheduled to become a trainee Provisional Instructor, demonstrating the use of a plastic splint on Reclamation Guide John A. Hansen, while Trainee Provisional Instructor Hattie A. Guerra looks on. Nurse Guerra conducted her first class at the Boulder Canyon Project and will receive her Provisional Instructor's Certificate from the Bureau of Mines. Observing on the left, is Mildred Rhoades, Regional Safety Clerk, who is a Bureau of Mines Instructor and Examiner. Photo PX-D-72395

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# WATER SAFETY

## RECORD OF PUBLIC DROWNINGS

January 1, 1972, through September 30, 1972

### Bureau-operated Facilities:

Canals	24
Reservoirs	2
Total	<u>26</u>

### Facilities Operated by Others:

Irrigation and Water Districts	35
State or County (Recreational)	43
Total	<u>78</u>

### Summary of Total Drownings During Period:

By Operating Agency:	
Bureau of Reclamation	26
Irrigation and Water Districts	35
State or County (Recreational)	43
Total	<u>104</u>

By Type of Facility:	
Canals	51
Reservoirs	53
Total	<u>104</u>

By Activity:	
Swimming	33
Boating	16
Fishing	4
Fell into water	20
Other	31
Total	<u>104</u>

By Age:	
Under 12 years of age	18
From 12 to 25	43
From 25 to 50	30
Over 50 years of age	13
Total	<u>104</u>

\* \* \* \* \*

# VEHICLE SAFETY

## STUDY SHOWS SAFETY BELTS PROTECT PREGNANT WOMEN

-- From "Traffic Safety"

A National Safety Council Publication

Pregnant women are better off using safety belts than not using them, the American Medical Association's Committee on Medical Aspects of Automotive Safety has concluded.

In a statement published in a recent issue of The Journal of the American Medical Association, the committee summarized its findings based on crash experiments using baboons and on studies of actual accidents involving pregnant women. "Despite the real possibility of belt-caused injury to the pregnant woman and her fetus in severe collisions," the committee declared, "the woman's overall chances for survival and freedom from serious injury are much better if she uses a restraint system."

The committee also concluded that use of lap and shoulder belts together affords much better protection than use of lap belts alone.

The committee reported on a series of controlled tests at Holloman Air Force Base in which pregnant baboons were subjected to crash forces of 20 Gs, roughly equivalent to rapid deceleration at 40 m.p.h. The baboon mothers protected by lap and shoulder belts all survived the impact, although some suffered serious injuries. Only three of the 11 fetuses sustained observable injuries, yet all 11 died. The committee concluded that these deaths were at least partially due to the surgical procedures used in implanting transducers in the animals before the experiments, because the fetuses of three control animals that underwent the surgery but not the impact also died.

In another study using baboons conducted at Wayne State University, 50 per cent of the lap-belted mothers lost their fetuses after withstanding a deceleration force of 23 Gs. However, only 8 per cent of the fetuses were lost when the mothers wore both lap and shoulder belts, according to the committee. None of the mothers in either case had any significant injuries.

The committee also noted that in a study of 441 human vehicle occupants involved in traffic accidents in California, the maternal fatality rate for unbelted mothers was just about double that for belted mothers, but fetal mortality, including those who died with their mothers, was unchanged by lap belt restraints.

The researchers found that the greatest percentage of deaths and injuries to both the mothers and the fetuses occurred in accidents where the mother was ejected from the vehicle. Of the 180 unbelted occupants, 33 per cent of those ejected were killed compared with a 5 per cent fatality rate for those who stayed in the vehicle. Seventy-two per cent of the ejectees suffered serious injuries as compared with 15 per cent of the non-ejectees.

Of those ejected, 47 per cent lost their fetuses, while only 11 per cent of the non-ejected mothers lost their fetuses. "Since death of unbelted victims is statistically related to ejection from the car," the committee concluded, "lap belts, which usually prevent such ejection, should be recommended for pregnant travelers."

The committee refused to speculate on the protective qualities of air bags and other passive restraint devices, saying that it remains to be seen whether these systems would provide better protection for pregnant women.

#### STUDIES SHOW ARGUMENTS FOR NOT WEARING SEAT BELTS UNREALISTIC

The reasons cited by motorists for not wearing safety belts are many, but all ignore the facts. Some motorists assert that they fear being "trapped" inside the car, rather than being, as they say, "thrown clear" in a crash. Their reasoning is false. Latest seat belt studies show that you are 30 times as likely to be killed if you are thrown out of a car than if you remain inside.

Fear of submersion in a body of water in an accident car also is cited by some as reason for not wearing safety belts. Studies have shown that submersion of the vehicle in an accident occurs in only .3 percent of all injury-producing accidents, an event of exceptionally low risk, which is comparable to the similar low risk of fire in serious accidents.

Studies conducted in the United States to date on the effectiveness of the combined lap-shoulder belts in accidents have been limited by the relatively small numbers of such restraint systems in use in crashes. Estimates of the use of lap-shoulder belts among those who have them available range from 2.5 percent to 5 percent. However, such data as are available indicate that this restraint system is extremely effective in reducing or eliminating injuries in severe crashes.



## SEAT BELTS PREVENTED SERIOUS INJURIES

-- By Clare A. Erickson  
Project Safety Officer  
Missouri-Souris Projects Office  
Bismarck, North Dakota

These photographs show a Power O&M International 1-ton pickup damaged in a rollover-type accident. The vehicle was traveling on an asphalt 2-lane U.S. Highway pulling a hotline tool trailer at 50 mph when the right rear tire blew out. The pickup swerved to the right immediately after the blowout and then to the left where it rolled completely over in the left borrow ditch, stopping on the wheels. The trailer rolled one and a half times stopping on its top, and it was still secured to the pickup with the safety chains but unhooked at the hitch. The vehicle driver and another passenger received bruises on their heads and bodies. However, the seat belts which they were wearing prevented serious injuries. It is very fortunate that there

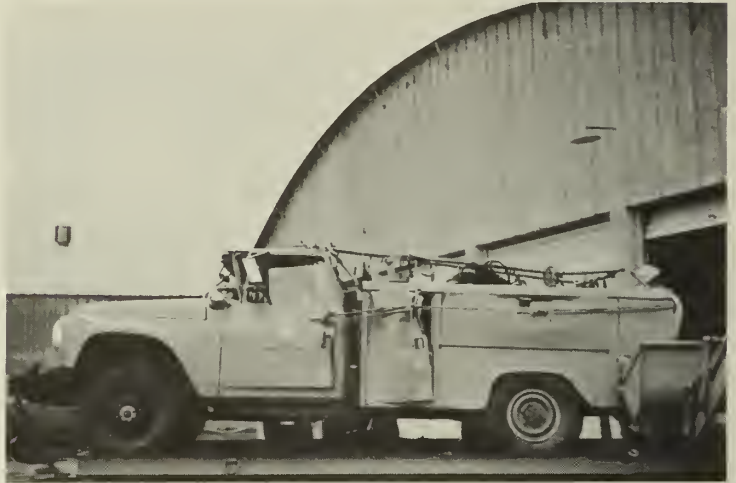


Photo PX-D-72396



Photo PX-D-72397

was no approaching traffic at the time. The tire blowout occurred due to the wheel rim splitting. It was determined that the vehicle was considerably overloaded, and this probably caused the rim to split. All Federal vehicles should be weighed to determine that the gross vehicle weight is not being exceeded.

\* \* \* \* \*

## PRESIDENT'S SAFETY AWARDS PRESENTED TO FEDERAL AGENCIES

The President's Safety Awards for the greatest reduction in injury frequency rates among Federal agencies during 1971 were presented on August 14 to the General Services Administration, the Treasury Department, and the Federal Maritime Commission.

The awards were presented by Caspar W. Weinberger, Director of the Office of Management and Budget, in a 2 p.m. ceremony in the East Garden of the White House. He was accompanied by Labor Secretary James D. Hodgson.

George C. Guenther, Assistant Secretary of Labor for Occupational Safety and Health, said the President's Award is given annually to Federal departments or agencies in three categories, based on the size of the agency and the job safety and health hazards in its operations.

"The overall rate for 1971 for all Federal agencies was 6 injuries per million employee hours worked, compared with 15.2 for the private sector," Guenther said. "The rates for the winners were 3.4 for GSA, 2.8 for Treasury, and a perfect record for the Maritime Commission."

Honorable Mention certificates were presented to the Department of Commerce, with a 3.5 rate; the Atomic Energy Commission, 1.6; the State Department, 1.8; and the Federal Reserve System, a perfect record.

The award program is administered by the Federal Safety Advisory Council, which Mr. Guenther also heads. OSHA's Office of Federal Agency Programs acts as the secretariat for the Advisory Council.

\* \* \* \* \*

## DID YOU KNOW THAT . . .

Carrying loose flashbulbs in your pocket can result in a painful burn. The friction of one bulb rubbing on another can set a bulb off, and when one flashbulb goes off, the heat it generates is likely to set the remaining bulbs off. The National Safety Council recommends that flashbulbs be kept in their wrappers prior to use. Avoid carrying loose bulbs in your pockets - they are a potential hazard.

A person should not wear sunglasses indoors under artificial light as this practice weakens the eyes' acceptance of all light.

## LABORATORY SAFETY

-- By E. T. Lyons, Research Chemist  
Applied Sciences Branch  
Division of General Research

Metallic mercury spills are common occurrences in scientific laboratories. These spills may range from a few drops of mercury from a broken thermometer to large losses resulting from breaking a storage container or a test apparatus. Significant concentrations of mercury vapor can result from these spills, and it is important that the spilled mercury be cleaned up as soon as possible in order to minimize inhalation of the mercury vapor.

Metallic mercury's major hazard is its volatility. The accepted safe limit of 0.1 milligram of mercury per cubic meter of air can be exceeded in working with mercury in a confined space at normal room temperature.

General and nonspecific symptoms of irritability, headache, and fatigue are reported as first symptoms of mercury poisoning. Chronic mercury poisoning is associated with tumors, as well as liver, kidney, and brain damage.

A highly efficient vacuum device for picking up small droplets of metallic mercury is now being used in the laboratories at the Engineering and Research Center in Denver. This device (shown in the photographs on page 17) was designed by chemist Argyle Campbell. It is unique in that the spilled mercury is pulled into the trap underwater and remains underwater, thus eliminating any possibility of mercury vapor being pumped through the vacuum source and out into the laboratory. This equipment has been used by the Denver Federal Center Fire Department and the Bureau of Mines, as well as by several laboratories in the Engineering and Research Center.

The unit shown in the photographs is composed of an industrial-type vacuum cleaner and a plastic tank fabricated from lucite plastic. Connections for the vacuum and pickup lines are built in to the top.



Photo PX-D-72392



Photo PX-D-72391

\* \* \* \* \*



## NIOSH RECOMMENDS LOWER NOISE LIMITS

The National Institute for Occupational Safety & Health has recommended lower noise limits in a 160-page criteria document recently sent to OSHA. In new installations, noise could not exceed a level of 85 dBA for an 8-hour work day. All places of employment, which now must meet the 90 dBA standard, would have to meet the new 85 dBA standard after a time period determined by the Secretary of Labor in consultation with the Secretary of Health Education Welfare. Figure I-1, line A, indicates the standard for new installations: the standard for all installations is indicated by line B (see page 19).

The document states that at no time shall any worker be exposed to effective noise levels exceeding 115 dBA. All measurements shall be made with the sound-level meter at a position which most closely approximates the noise levels at the head position of the employee during normal operations.

Data in the document indicate that approximately 14% of workers in manufacturing are exposed to noise levels above 90 dBA, but no data is available on the number exposed to levels of 85 dBA or to the technological feasibility of meeting the proposed 85 dBA standard in a given time period. Hence, the delay in the effective date will permit the Department of Labor to conduct extensive feasibility studies.

When employees work under conditions where noise exposures would exceed the limits above, administrative or engineering controls must be utilized to reduce exposures to within these limits. Personal protective equipment (ear protectors) shall be provided providing it is used only until engineering and administrative controls and procedures can bring the level within the prescribed limits and providing the ear protectors reduce the exposure to within the limits and are fitted by a person trained in the procedure.

The employer shall provide training in the proper care and use of the equipment, and inspection procedures must be set up to provide correct maintenance and use of the equipment.

The document also recommends medical surveillance, including audiometric testing, monitoring of record-keeping requirements, appraisal of employees of noise hazards, and the posting of warning notices at entrances to excessively noisy areas.

Single copies of the criteria document, "Occupational Exposure to Noise," may be obtained from the Information Officer, NIOSH, 1014 Broadway, Cincinnati, Ohio, 45202.

LINE A  
 FORMULA:  $T = 16 \div 2^{(L-80)/5}$   
 RANGE: 80 to 115 dBA-Slow

LINE B  
 FORMULA:  $T = 16 \div 2^{(L-85)/5}$   
 RANGE: 85 to 115 dBA-Slow

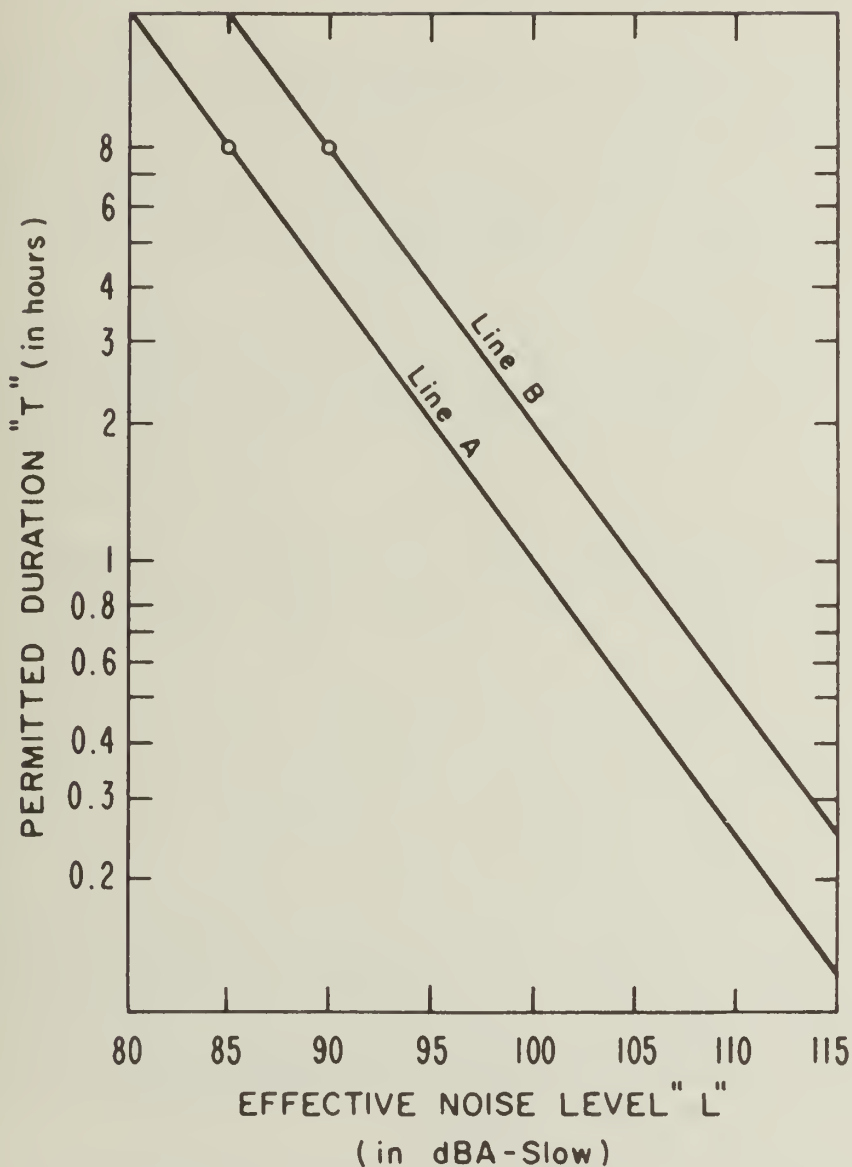


Figure I-1. Permitted duration vs. noise level.\*

\*The indicated duration limits which exceed 8 hours are to be used only for purposes of computing Daily Noise Dose and are not to be regarded as defining noise exposure limits for work days which exceed 8 hours.

## LABOR DEPARTMENT ISSUES JOB SAFETY AND HEALTH INSPECTION DETAILS

Itemized data for the Occupational Safety and Health Administration's first fiscal year of operations show that 32,700 inspections were made by OSHA in establishments employing 5,987,000 workers between July 1, 1971, and June 30, 1972.

Average employment size of the establishments inspected was 180, said George C. Guenther, Assistant Secretary of Labor for Occupational Safety and Health.

A total of 102,860 violations of standards were alleged in 23,230 citations to employers. The violations resulted in proposed penalties totaling \$2,291,000. Employee complaints totaled 4,950.

Job safety and health standards covering walking and working surfaces head the list of 25 regulations most frequently cited for alleged violations during workplace inspections, according to OSHA. The list of standards most frequently cited, in descending order, is as follows:

- Walking-working surfaces (General) - 1910.22
- Woodworking machinery (Requirements) - 1910.213
- Machines (General Requirements) - 1910.212
- Portable fire extinguishers - 1910.157
- Mechanical power transmission apparatus - 1910.219
- Grounding, electrical - 1910.314
- Sanitation - 1910.141
- Welding, cutting, brazing - 1910.252
- Guarding floor, wall openings - 1910.23
- Overhead and gantry cranes - 1910.179
- Flammable, combustible liquids - 1910.106
- Abrasive wheel machinery - 1910.215
- Means of egress (General) - 1910.37
- Outlets, switches, junction boxes, etc. - 1910.315
- Hand and portable power tools - 1910.242
- Spray finishing (Flammable, combustible materials) - 1910.107
- Powered industrial trucks - 1910.178
- Portable wood ladders - 1910.25
- Handling materials - General - 1910.176
- Means of egress (General Requirements) - 1910.36
- Electrical - General - 1910.310
- Fixed ladders - 1910.27
- Flexible cords and cables (Electrical) - 1910.316
- Personal Protective Equipment (General) - 1910.132
- Respiratory protection - 1910.134

## CONSTRUCTION COMPANY CONTESTS FIVE ALLEGED SERIOUS VIOLATIONS

A construction company was cited for alleged serious violation of 1926.550(a)(15)(i), 1926.652(k), 1926.652(d), 1926.651(h), and 1926.652(e) of the Safety and Health Regulations for Construction.

The citation alleged failure to maintain a minimum clearance of 10 feet between electrical transmission and distribution lines of 50 kilovolts or below and any part of the crane; failure to provide trench box or sliding trench shield to be used for the protection of personnel in lieu of a shoring system or sloping, and designed, constructed, and maintained in a manner which will provide protection equal to or greater than the sheeting or shoring required for the trench; failure to install materials used for sheeting and sheet piling, bracing, shoring, and underpinning in good serviceable condition; failure to flatten the angle of repose when an excavation has water conditions, silty materials, loose boulders, and areas where erosion, deep frost action and slide plane appear; slope of trench was not sufficient to provide safe angle of repose; and failure to take additional precautions by way of shoring and bracing to prevent slides or cave-ins.

The company also was cited for alleged nonserious violations including 1926.651(q), 1926.651(s), 1926.450(a)(7), 1926.450(a)(10), 1903.2(a), 1904.2(a), and 1904.4. The citation alleged failure to sheet-pile shore and brace the sides of the excavation to resist the extra pressure due to superimposed loads as a result of placing or operating power shovels, derricks, trucks, materials, or other heavy objects in a level above and near an excavation, failure to install substantial stoplogs, or barricades when mobile equipment is utilized or allowed adjacent to excavations; failure to use portable ladders at such a pitch that the horizontal distance from the top support to the base will not be greater than one-fourth the vertical distance between these points; failure to tie, block, or otherwise secure portable ladders in use to prevent their displacement; failure to post OSHA notice; required notice not posted at field office where employees report for work; failure to maintain log of all recordable illnesses; and failure to maintain a supplementary record of occupational injuries and illnesses.

\* \* \* \* \*

A complete revision of the Occupational Safety and Health Standards, Part 1910 of Title 29 of Code of Federal Regulations, through September 22, 1972, is contained in the Federal Register of October 18, 1972, Volume 37, No. 202, Part II. An amendment to 29 CFR 1910.217(f) is contained in the Federal Register of November 8, 1972, and concerns the operating of certain power presses by minors.



1972-73 EDITION OF NATIONAL FIRE CODES  
NOW AVAILABLE

Published in 10 volumes, the 1972-73 edition of the National Fire Codes consist of 220 authoritative fire safety standards, codes, recommended practices, and manuals. The codes are priced at \$5 per volume and \$40 for the complete set.

Some 68 standards, or nearly one-third of the total number appearing in the new edition of the codes, are printed in versions adopted at the 1972 NFPA Annual Meeting. Of these 68, four are completely new, many have undergone extensive revision and organization, and others contain important changes reflecting recent fire experience and technological developments.

The subject matter of the volumes is as follows: (1) flammable liquids, ovens, and boiler furnaces; (2) gases; (3) combustible solids, dusts, and explosives; (4) building construction and facilities; (5) electrical; (6) sprinklers, fire pumps, and water tanks; (7) alarm and special extinguishing systems; (8) portable and manual fire control equipment; (9) occupancy standards and process hazards; and (10) transportation.

Some 43 NFPA standards have been adopted by the American National Standards Institute. The standards are prepared and reviewed by 144 technical committees of the National Fire Protection Association.

The codes are available from the NFPA Publications Service Department, 60 Batterymarch Street, Boston, MA 02110. On request NFPA will mail a detailed descriptive leaflet listing the complete contents of each volume.

Other NFPA publications available are "Standards for the Installation of Portable Fire Extinguishers" (NFPA No. 10), 36 pages, \$1.25 per copy; and "Recommended Good Practice for the Maintenance and Use of Portable Fire Extinguishers" (NFPA No. 10A), 36 pages, \$1.25 per copy. Both of these publications discuss changes in NFPA standards on portable fire extinguishers. NFPA No. 10 has been revised completely and NFPA No. 10A has been revised slightly to conform with No. 10.

## CRANE HAZARDS

An Army contractor employee was attempting to move a crawler crane to a different site on the job. He attempted to move it under communication lines, but he found there was not enough clearance. He then backed the crane and lowered the boom to the ground. The operator and the oiler were to remove the pins at the rear of the crane to allow the gantry to fold over the crane and be low enough to proceed under the communication lines. At the time they started this procedure the boom lines were slack. The operator's manual states that the boom be lowered to the ground and boom hoist tension be slightly reduced. The gantry is then lowered by slowly increasing slack in the boom hoist line. When the operator removed his pin on the right side the gantry still held until the pin on the left was removed. The moment the pins on both sides were out the gantry collapsed in a scissor-like action. The operator, on the right, received a glancing blow on his hard hat. The oiler, on the left, was caught in the fold of the gantry. His left arm and leg were crushed and subsequently amputated, the leg above the knee and the arm above the elbow.

The operator was experienced in crane operation, though not with this new machine. The oiler had helped move this crane under the same lines four times previously. Both men were standing on the counterweight when the gantry collapsed. The operator was hit a glancing blow on the head by the gantry when it collapsed and knocked off the counterweight. Evidently his reflex action made him move out of the way at the right moment so that he was not caught. He credits his hard hat with saving his life.

The slack in the cables allowed the gantry to collapse. Standard Operating Procedures direct the boom will touch the ground with slightly reduced boom hoist tension. The boom was touching the ground at the time of the accident.

To prevent this sort of accident in the future the manufacturer was requested to incorporate a safety device which would prohibit collapse of the gantry in the event of excess slack cable. Suggested possible devices included a positive drive gear train for up and down motion of the gantry, or a ratchet type holding device. Another suggestion was to install a buzzer and light that would react when tension was off the boom.

So far the manufacturer has not come up with a positive safety device. They have had warning plates printed, and they are distributing them to owners of these cranes and similar equipment. The plates read, "WARNING. STAND CLEAR OF GANTRY, OUTSIDE OF GANTRY AREA WHEN REMOVING LOCKING PINS AND WHILE RAISING OR LOWERING. FOLLOW OPERATING INSTRUCTIONS."

# WARNING

OPERATIONS ADJACENT TO OVERHEAD LINES IS PROHIBITED UNLESS ONE OF THE FOLLOWING CONDITIONS IS SATISFIED.

1 POWER HAS BEEN SHUT OFF AND POSITIVE MEANS TAKEN TO PREVENT LINES FROM BEING ENERGIZED.

2 POSITION AND BLOCK EQUIPMENT INSURING NO PARTS, INCLUDING CABLE, CAN COME WITHIN THE FOLLOWING CLEARANCES;

VOLTAGE REQD CLEARANCE

UNDER 69 KV—10 FEET

69 KV—12 FEET

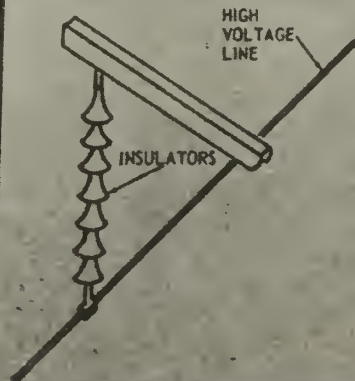
115-161 KV—15 FEET

230-285 KV—20 FEET

345 KV—25 FEET

500 KV—35 FEET

3



COUNT INSULATORS SUPPORTING LINE TO DETERMINE LINE VOLTAGE

INSULATORS IN A STRING

LINE VOLTAGE

2	13200
2-3	23000
2-3	34500
4-5	49000
5-6	68000
6-8	110000
8-10	138000
9-11	154000
12-16	230000
18	345000

ref 205-101

Photo PX-D-72396

The above is a sign developed by the Army for placing in crane and hoisting equipment cabs on OSHA standards for clearance of power-lines.



# SAFETY PERFORMANCE RECORD

## CUMULATIVE QUARTERLY REPORT GOVERNMENT FORCES

3rd QUARTER, 1972

PERIOD FROM JANUARY 1, 1972 THROUGH September 30, 1972

REPORTING OFFICE	NUMBER OF EMPLOYEES (AVERAGE)	MAN HOURS	DISABLING INJURIES		DAYS LOST	FREQUENCY RATE	SEVERITY RATE
			CUMULATIVE THIS YEAR	CUMULATIVE THIS YEAR			
Washington Office	218	367,542					
Denver Office	1,225	1,916,606					
PACIFIC NORTHWEST REGION							
Boise Regional Office	191	277,038	1		2	3.6	7
Central Snake Project	38	69,734	1		2	20.1	60
Chief Joseph Dam Project	30	42,568					
Columbia Basin Project	221	355,008	2		8	5.6	23
East Greenacres Project Office	17	17,854					
Grand Coulee Dam Operations Office	276	437,872	2		3	4.6	7
Green Springs Powerplant	3	3,135					
Hunery Horse Project	37	53,925					
Lower Columbia Planning Office	32	49,558					
McKay Dam	1	1,600					
Minidoka Project	65	100,302					
S Snake River Planning Office	34	48,700					
Teton Project Office	50	59,247					
Third Powerplant Construction Office	212	321,303					
Tualatin Project Office	37	42,173	1		15	23.7	356
Upper Columbia Planning Office	30	43,226					
Yakima Project Office	28	40,399					
Totals & Averages	1,302	1,943,642	7		30	3.6	15
MID-PACIFIC REGION							
Sacramento Regional Office	487	799,436					
Regional Drill Core	15	31,416	1		6	31.8	191
Auburn-Folsom South Unit CVP	152	318,044	1		4	3.1	13
Construction Office							
Cachuma Operations Field Branch	2	3,056					
Central Coast Planning Field Branch	3	4,320					
Folsom Field Division	78	119,442					
Fresno CVP Construction Office	268	314,938					
Fresno Field Division	134	203,744					
Klamath Project Office	18	24,299					
Lahontan Basin Projects Office	21	31,801					
Sacramento Valley CVP Constr. Office	130	166,804					
San Luis Unit CVP Construction Office	135	205,880					
Shasta Field Division	2	3,240					
Solano Operations Field Branch	158	236,141	2		51	8.5	216
Tracy Field Division							
Totals & Averages	1,623	2,493,931	4		61	1.6	24
LOWER COLORADO REGION							
Boulder City Regional Office	209	298,880					
Arizona Projects Office	122	153,820					
Boulder Canyon Project	136	232,759	1		1	4.3	4
Lower Colorado River Project		152,090					
Parker-Davis Project	292	463,144					
Southern California Planning Office	17	23,540					
Yuma Projects Office	253	200,916					
Totals & Averages	1,029	1,525,149	1		1	0.7	1
UPPER COLORADO REGION							
Salt Lake City Regional Office	211	330,900	1		2	3.0	6
Central Utah Projects	204	317,878					
CRSP Power Operations Office	271	370,399	1		13	2.7	35
Durango Projects Office	66	85,778	1		1	11.7	12
Grand Junction Projects Office	113	172,373					
Logan Development Office	5	7,800					
Lyman Project Office	11	13,405					
Upper Green River Projects Office	11	21,408					
Totals & Averages	892	1,319,941	3		16	2.3	12
SOUTHWEST REGION							
Amarillo Regional Office	114	166,803					
Albuquerque Development Office	25	42,897					
Austin Development Office	24	46,064					
Joan Program Projects Office	1	1,560					
Middle Rio Grande Project	198	340,650					
Mountain Park Project	50	66,450					
Navajo Project	92	144,865	3		74	20.7	511
Oklahoma City Development Office	16	21,893					
Palmetto Bend Project	48	36,866					
Pecos River Office	18	23,939					
Rio Grande Project	178	273,715	1		3	3.7	11
San Juan-Chama Project	18	31,839					
Totals & Averages	782	1,197,341	4		77	3.3	64
CONSOLIDATED TOTALS							
TOTALS LAST YEAR (19 )							

\*FATALITIES INCLUDED IN TOTAL DISABLING



# SAFETY PERFORMANCE RECORD

3rd QUARTER, 1972.

PERIOD FROM JANUARY 1, 1972-- THROUGH September 30, 1972--

REPORTING OFFICE	NUMBER OF EMPLOYEES	MAN HOURS	DISABLING INJURIES		DAYS LOST	FREQUENCY RATE	SEVERITY RATE
		CUMULATIVE THIS YEAR	CUMULATIVE THIS YEAR	FATAL*	CUMULATIVE THIS YEAR	CUMULATIVE THIS YEAR	CUMULATIVE THIS YEAR
UPPER MISSOURI REGION							
Billings Regional Office	162	235,080					
Geology and Drill Crews	8	12,419					
Canyon Ferry Project	21	28,046	1		2	35.7	71
Fort Peck Project	42	56,610					
Missouri-Osage Projects	210	284,960					
Missouri-Souris Projects	341	515,099	1		6	1.9	12
Power System Operations Office	50	79,200					
Riverton Project	5	7,254					
Upper Missouri Projects	63	93,700	1		25	10.7	267
Yellowtail Project Office	39	51,912					
Totals & Averages	941	1,364,240	3		33	2.2	24
LOWER MISSOURI REGION							
Denver Regional Office	183	284,728					
Cheyenne Construction Office	29	21,432					
Fryingpan-Arkansas Project	197	283,284					
Kansas River Projects	94	182,448					
Niobrara-Lower Platte Development Office	41	59,392					
North Platte River Projects	201	326,160					
South Platte River Projects	153	245,600					
Totals & Averages	898	1,365,751					
CONSOLIDATED TOTALS							
	8,910	13,494,343	22		218	1.6	16
TOTALS LAST YEAR (1971)							
	8,645	17,781,946	31	1	6,653	1.7	374
*FATALITIES INCLUDED IN TOTAL DISABLING							
JOB CORPS CONSERVATION CENTERS							
Columbia Basin Job Corps Center							
Staff	70	212,720	2		47	9.4	221
Corpsmen	203	872,176					
Marsing Job Corps Center							
Staff	58	164,464					
Corpsmen	171	735,720	1		75	1.4	102
Collbran Center							
Staff	58	87,544					
VISTA	1	4,542					
Corpsmen	93	549,888					
Weber Basin Job Corps Center							
Staff	61	100,372	1		2	10.0	20
VISTA	1	2,056					
Corpsmen	178	942,408					
TOTAL STAFF							
	247	565,100	3		49	5.3	87
TOTAL VISTA							
	2	6,598					
TOTAL CORPSMEN							
	645	3,101,192	1		75	0.3	24
CONSOLIDATED TOTALS							
	894	3,672,890	4		124	1.1	34
TOTALS LAST YEAR (1971)							
	945	5,004,546	2		42	0.6	8

\*FATALITIES INCLUDED IN TOTAL DISABLING

# SAFETY PERFORMANCE RECORD

## CUMULATIVE QUARTERLY REPORT

### CONTRACTOR FORCES

3rd QUARTER, 1972

PERIOD FROM JANUARY 1, 1972, THROUGH September 30, 1972

REPORTING OFFICE	NUMBER OF EMPLOYEES (AVERAGE)	MAN HOURS	DISABLING INJURIES		DAYS LOST	FREQUENCY RATE	SEVERITY RATE
			CUMULATIVE THIS YEAR	CUMULATIVE THIS YEAR			
PACIFIC NORTHWEST REGION							
Boise Regional Office		881					
Central Snake Project		150					
Chief Joseph Dam Project	51	32,860					
Columbia Basin Project	97	115,425	9	1	6,054	78.0	52,850
East Greenacres Project Office	5	1,709					
Grand Coulee Dam Operations Office	10	3,401					
Hungry Horse Project		200					
Teton Project Office	436	377,977	1		22	2.6	58
Third Powerplant Construction Office	1,374	1,775,896	4	1	6,065	2.3	3,416
Tualatin Project Office	213	68,889					
Yakima Project	4	576	1		3	1736.1	5,208
Totals & Averages	2,190	2,377,964	15	2	12,144	6.3	5,107
MID-PACIFIC REGION							
Sacramento Regional Office		184					
Auburn-Folsom South Unit CVP Construction Office	572	611,233	7	1	6,164	11.5	10,085
Folsom Field Division		1,920					
Fresno CVP Construction Office	344	262,632	4		125	15.2	476
Klamath Project Office	4	240					
Sacramento Valley CVP Constr. Office	254	87,027	1		10	11.5	115
San Luis Unit CVP Construction Office		21,797					
Shasta Field Division	3	1,323					
Tracy Field Division	2	6,420					
Totals & Averages	1,179	992,776	12	1	6,299	12.1	6,345
LOWER COLORADO REGION							
Boulder City Regional Office		11,379	6		146	527.3	12,831
Arizona Projects Office	14	4,268					
Boulder Canyon Project	3	4,502					
Lower Colorado River Project		1,835					
Parker-Davis Project	2	16,880	1		15	59.2	889
Yuma Projects Office		3,053					
Totals & Averages	19	41,917	7		161	167.0	3,841
UPPER COLORADO REGION							
Salt Lake City Regional Office	7	20,458					
Central Utah Projects	328	400,915	5		77	12.5	192
Grand Junction Projects	68	47,964	1		6	20.8	125
Upper Green River Projects Office	3	588					
Totals & Averages	406	469,925	6		83	12.8	177
SOUTHWEST REGION							
Amarillo Regional Office		120					
Mountain Park Project	10	10,337					
Navajo Project	191	261,709	9		324	34.4	1,238
Palmetto Bend Project	6	3,233					
Rio Grande Project	6	820					
San Juan-Chama Project	29	13,181	1		3	75.9	228
Totals & Averages	242	289,400	10		327	34.6	1,130
UPPER MISSOURI REGION							
Missouri-Oahe Projects	42	29,992					
Missouri-Souris Projects	400	319,800	2		63	6.3	197
Riverton Project	8	5,356					
Upper Missouri Projects		17,121					
Totals & Averages	450	372,269	2		63	5.4	169
LOWER MISSOURI REGION							
Cheyenne Construction Office	55	36,609					
Fryingpan-Arkansas Project	389	442,696	11		123	24.8	278
Kansas River Projects	30	21,911					
North Platte River Projects	3	11,580					
South Platte River Projects		0					
Totals & Averages	477	512,796	11		123	21.5	240
CONSOLIDATED TOTALS							
	4,963	5,057,047	63	3	19,200	12.1	3,797
TOTALS LAST YEAR (1971)	2,246	6,780,040	57		1,599	8.4	236

\*FATALITIES INCLUDED IN TOTAL DISABLING












CPO 845-139







# KNOW YOUR FIRE EXTINGUISHERS

	WATER TYPE						FOAM	CARBON DIOXIDE	DRY CHEMICAL		
	STORED PRESSURE	CARTRIDGE OPERATED	WATER PUMP TANK	SODA ACID	FOAM	SODIUM OR POTASSIUM BICARBONATE			MULTI-PURPOSE ABC		
<b>CLASS A</b> FIRES WOOD, PAPER, TRASH HAVING GLOWING EMBERS <b>CLASS B</b> FIRES FLAMMABLE LIQUIDS, GASOLINE, OIL, PAINTS, GREASE, ETC. <b>CLASS C</b> FIRES ELECTRICAL EQUIPMENT <b>CLASS D</b> FIRES COMBUSTIBLE METALS											
	YES	YES	YES	YES	YES	NO (BUT WILL CONTROL SMALL SURFACE FIRES)	NO (BUT WILL CONTROL SMALL SURFACE FIRES)	NO (BUT WILL CONTROL SMALL SURFACE FIRES)	YES	YES	
	NO	NO	NO	NO	YES	YES	YES	YES	YES	YES	
	NO	NO	NO	NO	NO	YES	YES	YES	YES	YES	
SPECIAL EXTINGUISHING AGENTS APPROVED BY RECOGNIZED TESTING LABORATORIES											
METHOD OF OPERATION	PULL PIN—SQUEEZE HANDLE	TURN UPSIDE DOWN AND BUMP	PUMP HANDLE	TURN UPSIDE DOWN	TURN UPSIDE DOWN	PULL PIN—SQUEEZE LEVER	RUPTURE CARTRIDGE—SQUEEZE LEVER	PULL PIN—SQUEEZE HANDLE	PULL PIN—SQUEEZE HANDLE	RUPTURE CARTRIDGE—SQUEEZE LEVER	
	30' - 40'	30' - 40'	30' - 40'	30' - 40'	30' - 40'	3' - 8'	5' - 20'	5' - 20'	5' - 20'	5' - 20'	
MAINTENANCE	CHECK AIR PRESSURE GAUGE MONTHLY	WEIGH GAS CARTRIDGE—ADD WATER IF REQUIRED ANNUALLY	DISCHARGE AND FILL WITH WATER ANNUALLY	DISCHARGE ANNUALLY RECHARGE	DISCHARGE ANNUALLY RECHARGE	WEIGH SEMI-ANNUALLY	WEIGH GAS CARTRIDGE—CHECK CONDITION OF DRY CHEMICAL ANNUALLY	CHECK PRESSURE GAUGE AND CONDITION OF DRY CHEMICAL ANNUALLY	CHECK PRESSURE GAUGE AND CONDITION OF DRY CHEMICAL ANNUALLY	WEIGH GAS CARTRIDGE—CHECK CONDITION OF DRY CHEMICAL ANNUALLY	
	30' - 40'	30' - 40'	30' - 40'	30' - 40'	30' - 40'	3' - 8'	5' - 20'	5' - 20'	5' - 20'	5' - 20'	



# RECLAMATION SAFETY NEWS

# ZERO in

# ON SAFETY..

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MAR 30 1973

UNIVERSITY OF ILLINOIS  
AT URBANA-CHAMPAIGN

*Fourth Quarter and  
Annual Report 1972*

UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF RECLAMATION  
ENGINEERING AND RESEARCH CENTER  
DENVER, COLORADO

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## TABLES

### Safety Performance Record

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FRONT COVER: President Nixon has ordered special emphasis be given in 1973 to the reduction of job health hazards in Federal workplaces. To capitalize on gains made in 1970 and 1971 in Federal job safety, the President also has extended the "Zero-In On Federal Safety" program through December 1973. The "Zero-In" program clearly demonstrated its value in 1971 by reducing the Federal Government injury frequency rate to 6.0 disabling injuries per million employee-hours worked, compared with 15.2 for the private sector. In its first 2 years, the "Zero-In" program saved an estimated \$15 million and averted some 17,000 injuries. (Cover by J. L. Vitaliano, Illustrator, Denver E&R Center.)

SAFETY NEWS is published quarterly by the Engineering and Research Center, Division of Safety, Bureau of Reclamation, P.O. Box 25007, Denver Federal Center, Denver, Colorado 80225, in the interest of accident prevention.

THE WHITE HOUSE

WASHINGTON

November 15, 1972

MEMORANDUM FOR HEADS OF

FEDERAL DEPARTMENTS AND AGENCIES


In 1971, I initiated the "Zero-In On Federal Safety" Program to replace "Mission Safety 70." The value of the "Zero-In" program was clearly demonstrated during that year when the frequency rate of disabling injuries dropped by nine percent over 1970. The 1971 rate of 6.0 disabling injuries per million man-hours worked is in fact the lowest ever achieved in the Federal Government.

This downward trend must be continued.

In an effort to obtain greater benefits from this program and to carry out our responsibility under the Occupational Safety and Health Act of 1970, I am extending the program of "Zero-In On Federal Safety" through December, 1973. In addition, we must develop a concerted effort to reduce occupational health hazards which may be present in Government workplaces.

Each agency is hereby directed to establish means to meet these objectives. The Secretary of Labor will outline a suggested program for all agencies to follow. Specific guidelines and materials will be provided through the Occupational Safety and Health Administration of the Department of Labor.

It is my sincere hope that you will continue to give your fullest support to the "Zero-In On Federal Safety" program during 1973. Through its effective implementation, the Federal Government -- as the Nation's largest employer -- will set an example for all.

A handwritten signature in dark ink, appearing to read "Richard Nixon", is positioned at the bottom right of the page. The signature is fluid and cursive, with a long, sweeping underline.



# BUREAU SAFETY PERFORMANCE

## 1972 CUMULATIVE ACCIDENT RECORD

January 1 - December 31, 1972

### A. GOVERNMENT FORCES

Region	Injury index*	Frequency rate	Severity rate	Vehicle accident rate*
Pacific Northwest	1.5	4.3	34	4.0
Mid-Pacific	0.2	1.2	18	2.4
Lower Colorado	0.01	0.5	1	3.2
Upper Colorado	0.5	2.3	22	3.7
Southwest	3.6	3.8	96	2.7
Upper Missouri	0.3	1.7	18	2.7
Lower Missouri	<u>0.04</u>	<u>0.6</u>	<u>7</u>	<u>6.0</u>
Totals 1972	0.4	1.7	21	3.4
Totals 1971	6.4	1.7	374	3.3

\*Injury index is equal to frequency rate times severity rate divided by 100.  
Vehicle accident rate is the number of accidents per million miles driven.

### B. CONTRACTOR FORCES

Region	Injury index	Frequency rate	Severity rate	Fatal injuries
Pacific Northwest	245.4	6.4	3,835	2
Mid-Pacific	538.8	11.3	4,768	1
Lower Colorado	4658.9	142.3	3,274	0
Upper Colorado	12.0	9.3	129	0
Southwest	1098.4	38.1	2,883	0
Upper Missouri	6.6	5.5	120	0
Lower Missouri	<u>34.3</u>	<u>15.5</u>	<u>221</u>	<u>0</u>
Totals 1972	333.7	11.4	2,927	3
Totals 1971	19.8	8.4	236	0

### BUREAU CONTRACTORS' 3-YEAR AVERAGE (1970-1972)

Frequency rate: 9.5  
Severity rate: 1,621

C. RECLAMATION CIVILIAN CONSERVATION CENTERS

Frequency rate	1.2
Severity rate	32
Vehicle accident rate	14.9

D. LOST TIME ACCIDENT ANALYSIS - GOVERNMENT FORCES 1972

Accident Classification:

<u>Description</u>	<u>No.</u>	<u>Days lost</u>
Lifting	5	47
Vehicles	5*	182*
Striking against objects	2	5
Struck by objects	3	17
Caught in, under, or between	4	23
Falls - on same level	6**	99**
Falls - to different level	3	32
Slip or twist	4***	40***
Inhalation	<u>3</u>	<u>17</u>
Totals	35	462

\* Includes two Job Corps staff members with 47 days lost time.

\*\* Includes two Job Corps staff members with 29 days lost time.

\*\*\* Includes one Job Corps staff member with 2 days lost time.

E. SERIOUS INJURIES - CONTRACTOR EMPLOYEES

A contractor employee in the Mid-Pacific Region was fatally injured when struck by falling rock in a tunnel.

A contractor employee in the Pacific Northwest Region was fatally injured when the boom of the drill rig he was operating contacted an overhead powerline.

A contractor employee in the Pacific Northwest Region was fatally injured when a cantilever form anchor system failed, and the form, concrete, and employee fell approximately 180 feet down the face of the dam.

\* \* \* \* \*

# TREND AND OUTLOOK

**GOVERNMENT FORCES** - During 1972, Bureau employees worked 17,873,827 man-hours, experiencing only 30 disabling injuries and 384 lost man-days. The resulting accident frequency rate of 1.7 and severity rate of 21 represent one of the best safety performance years in Reclamation history and is a commendable record. The vehicle accident rate of 3.4 accidents per million miles driven is a slight increase over the 3.3 rate experienced in 1971. While this rate remained rather stable, there is an alarming increase in the number of accidents considered preventable by the Government driver. This increase indicates that more stringent measures must be implemented if a major hazard to Government employees is to be effectively controlled. The total direct cost of accidents, including disabling and nondisabling injuries, fires, claims, motor vehicle accidents, and property damage, was \$327,365, compared with \$256,540 the preceding year, or 27.6 percent increase.

**PUBLIC SAFETY** - Continued efforts to curb drownings on Bureau-operated canals and reservoirs resulted in two less drownings in 1972 than in 1971 despite the continuing increase in public exposure. Less encouraging is the rise in the number of drownings which occurred on Bureau-constructed waterways operated by water districts and others.

**JOB CORPS CIVILIAN CONSERVATION CENTERS** - Five staff members and one corpsman sustained disabling injuries in 1972 compared with injuries to two staff members and one corpsman in 1971. This is a 50 percent increase and raises the Centers' normally low frequency and severity rates of below 1.0 and 10, respectively, to a frequency rate of 1.2 and a severity rate of 32. These rates still remain comparable to overall Bureau figures and represent continued strong accident efforts by Center Directors and staff. During the first three quarters of calendar year 1972, there were encouraging signs that Center vehicle accidents were being controlled with only six accidents during this period. This encouragement was short lived when seven Center drivers (five staff and two corpsmen) were involved in vehicle accidents during the fourth quarter, resulting in a total of seven staff members and six corpsmen drivers being involved in accidents during the year. The excellent record of the first three quarters did reflect favorably on the overall performance with vehicle accidents being reduced from 25 in 1971 to 13 in 1972, resulting in a substantial decrease in the rate from 27.1 to 14.9 vehicle accidents per million miles driven.

The six Bureau-administered Youth Conservation Corps Camps, with approximately 204 youths, were operated during the summer months with two disabling injuries and one vehicle accident. This safety performance was considerably below the 1971 experience when no serious or disabling injuries were recorded. Efforts to improve performance

must be implemented in advance of operations with contractor preconstruction meetings, closer control over the condition of transportation vehicles and licensing of operators, more training of staff members in fire prevention, first aid, and accident prevention programs. These preoperational efforts, coupled with adequate inspection of contractor facilities and operations, will improve the safety performance structure.

**CONTRACTOR FORCES** - During 1972, Bureau contractor employees worked 7,030,223 man-hours, experiencing 80 disabling injuries and 20,576 lost man-days, including three fatalities. The resulting accident frequency rate of 11.4 accidents per million man-hours worked and severity rate of 2,927 man-days lost per million man-hours of exposure was a 36 percent increase in the frequency rate and a 114 percent increase in the severity rate over 1971 when Bureau contractors set a new overall safety performance record. Equally disappointing was the increase in contractor fatalities from zero in 1971 to three in 1972. Tunneling operations continue to account for more than one-third of the total injuries with one-seventh of the man-hours exposure. Canal construction ranks second in number of injuries with correspondingly high frequency and severity rates.

**OBJECTIVES FOR 1973** - The single greatest impact on the Bureau of Reclamation's Safety Program during 1971 and 1972 was the adoption of standards, codes, and regulations promulgated under the Williams-Steiger Occupational Safety and Health Act of 1970. No one part of the safety program has caused more concern to Bureau management than incorporating these standards, codes, and regulations into the Bureau's existing safety program, design standards, specifications, and existing operational facilities. The main thrust of the Bureau's safety efforts in 1973 will be directed toward the full implementation of these requirements. Following is a list of specific objectives outlined for 1973 with a brief description of implementation methods.

Bureau Employee Educational Program. Regional awareness and educational program will be through overview discussions of OSHA standards by regional personnel at all operating offices, followed by small formal detailed group discussions on pertinent regulations. Discussed standards, codes, or regulations requiring further clarification will be referred to the respective safety manager for review and further discussion at a later meeting. Engineering and Research Center employees' educational awareness program will be through overview discussions by the Chief, Division of Safety, followed by formal detailed group discussions with clarification meetings as required.



Contractor Awareness Program. Contractor managers and safety professionals will be invited to attend Bureau-conducted safety seminars directed at clarifying the Bureau's specifications requirements relating to safety regulations, including OSHA standards. Contractor participants will be asked to submit questions or appropriate discussion items prior to the seminars.

Updating Safety Manuals to Reflect Changes in OSHA Standards. Divisions at the Engineering and Research Center, in cooperation with the Chief, Division of Safety, will develop procedures for continually updating Bureau Safety and Health Regulations for Construction and Power System Safety Standards to reflect changes now being effected in regulations promulgated by the Department of Labor. In addition, the Division of Power O&M will review and revise appropriate Power O&M bulletins to insure compatability with the national standards.

Bureau Facilities Conformance Inspections. Operating offices will inspect existing Bureau facilities for conformance with new regulations. They will immediately upgrade nonconforming facilities requiring minor changes. Nonconforming items or facilities requiring appropriated moneys for upgrading will be submitted to the E&R Center for evaluation compilation and forwarding to the Commissioner's Office.

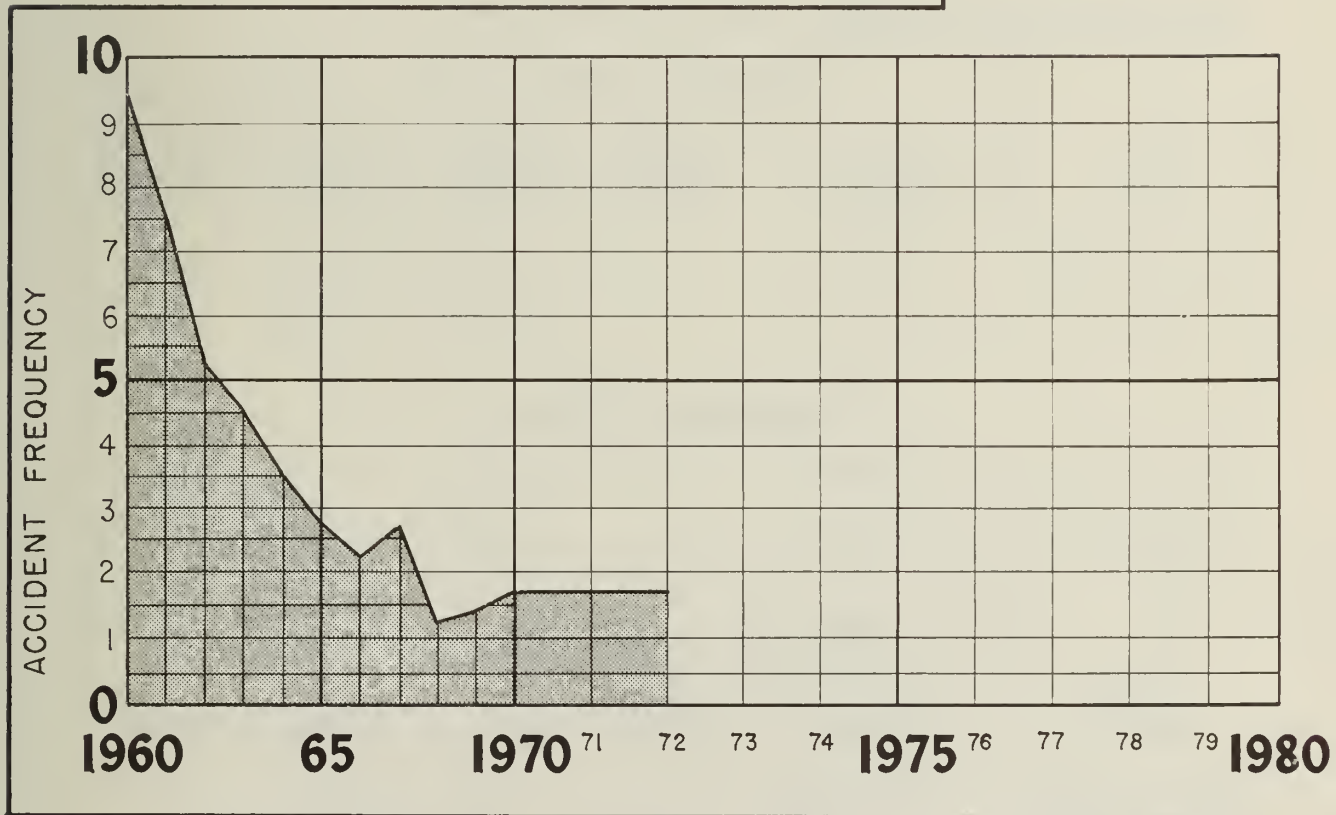
Priority Attention to Key Features of Program. Priority attention will be given to certain key features of safety activities, such as noise control and hearing conservation, physical fitness qualifications program, water safety efforts, driver improvement training, safety training for construction personnel, and refresher and certification training in live-line barehand power maintenance techniques.

Calendar year 1973 must be dedicated to conciliation and refinement of our proven safety techniques and programs and to the effective incorporation of OSHA requirements into our total safety effort.

\* \* \* \* \*

# THE RECORD

## GOVERNMENT FORCES



The following accident statistical tabulations indicate areas of strength and weakness and should be helpful in directing our efforts to specific locations, operations, and phases of accident prevention requiring improvement.

## WORK ACTIVITY - BUREAU-WIDE

<u>Type of work</u>	<u>Man-hour exposure</u>	<u>Disabling injuries</u>	<u>Days lost</u>	<u>Frequency rate</u>	<u>Severity rate</u>
Administration	7,826,562	3	24	0.4	3
Construction	2,999,864	8	179	2.7	60
Investigation	1,497,763	3	31	2.0	21
Irrigation O&M	1,890,581	8	114	4.2	60
Power O&M	<u>3,659,057</u>	<u>8</u>	<u>36</u>	<u>2.2</u>	<u>10</u>
1972 Totals	17,873,827	30	384	1.7	21
1971 Totals	17,781,946	31	6,653	1.7	374

## ORGANIZATIONAL UNIT

### Washington Office

<u>Year</u>	<u>Man-hour exposure</u>	<u>Disabling injuries</u>	<u>Days lost</u>	<u>Frequency rate</u>	<u>Severity rate</u>
1972 Totals	488,214	0	0	0.0	0
1971 Totals	522,924	0	0	0.0	0

### E&R Center - Denver

1972 Totals	2,528,926	0	0	0.0	0
1971 Totals	2,528,334	1	31	0.4	12

### Pacific Northwest Region

<u>Major activity</u>	<u>Man-hour exposure</u>	<u>Disabling injuries</u>	<u>Days lost</u>	<u>Frequency rate</u>	<u>Severity rate</u>
Administration	680,439	2	17	2.9	25
Construction	637,316	4	40	6.3	63
Investigation	246,652	0	0	0.0	0
Irrigation O&M	361,552	2	24	5.5	66
Power O&M	<u>629,108</u>	<u>3</u>	<u>5</u>	<u>4.8</u>	<u>8</u>
1972 Totals	2,555,067	11	86	4.3	34
1971 Totals	2,535,595	5	6,146	2.0	2,424

Mid-Pacific Region

<u>Major activity</u>	<u>Man-hour exposure</u>	<u>Disabling injuries</u>	<u>Days lost</u>	<u>Frequency rate</u>	<u>Severity rate</u>
Administration	1, 195, 683	0	0	0.0	0
Construction	762, 117	1	4	1.3	5
Investigation	243, 870	1	6	4.1	25
Irrigation O&M	515, 280	2	51	3.9	99
Power O&M	<u>610, 747</u>	<u>0</u>	<u>0</u>	<u>0.0</u>	<u>0</u>
1972 Totals	3, 327, 697	4	61	1.2	18
1971 Totals	3, 266, 483	5	80	1.5	24

Lower Colorado Region

Administration	656, 662	0	0	0.0	0
Construction	378, 682	0	0	0.0	0
Investigation	83, 404	0	0	0.0	0
Irrigation O&M	120, 840	0	0	0.0	0
Power O&M	<u>804, 157</u>	<u>1</u>	<u>1</u>	<u>1.2</u>	<u>1</u>
1972 Totals	2, 043, 745	1	1	0.5	1
1971 Totals	2, 229, 360	7	152	3.1	68

Upper Colorado Region

Administration	679, 956	0	0	0.0	0
Construction	274, 262	0	0	0.0	0
Investigation	335, 407	2	25	6.0	75
Irrigation O&M	34, 754	1	1	29.4	29
Power O&M	<u>418, 558</u>	<u>1</u>	<u>13</u>	<u>2.4</u>	<u>31</u>
1972 Totals	1, 742, 237	4	39	2.3	22
1971 Totals	1, 666, 864	8	206	4.8	124



### Southwest Region

<u>Major activity</u>	<u>Man-hour exposure</u>	<u>Disabling injuries</u>	<u>Days lost</u>	<u>Frequency rate</u>	<u>Severity rate</u>
Administration	466, 710	1	7	2.1	15
Construction	278, 125	3	135	10.8	485
Investigation	141, 907	0	0	0.0	0
Irrigation O&M	630, 983	1	7	1.6	11
Power O&M	<u>64, 103</u>	<u>1</u>	<u>3</u>	<u>15.6</u>	<u>47</u>
1972 Totals	1, 581, 828	6	152	3.8	96
1971 Totals	1, 506, 059	2	16	1.3	11

### Upper Missouri Region

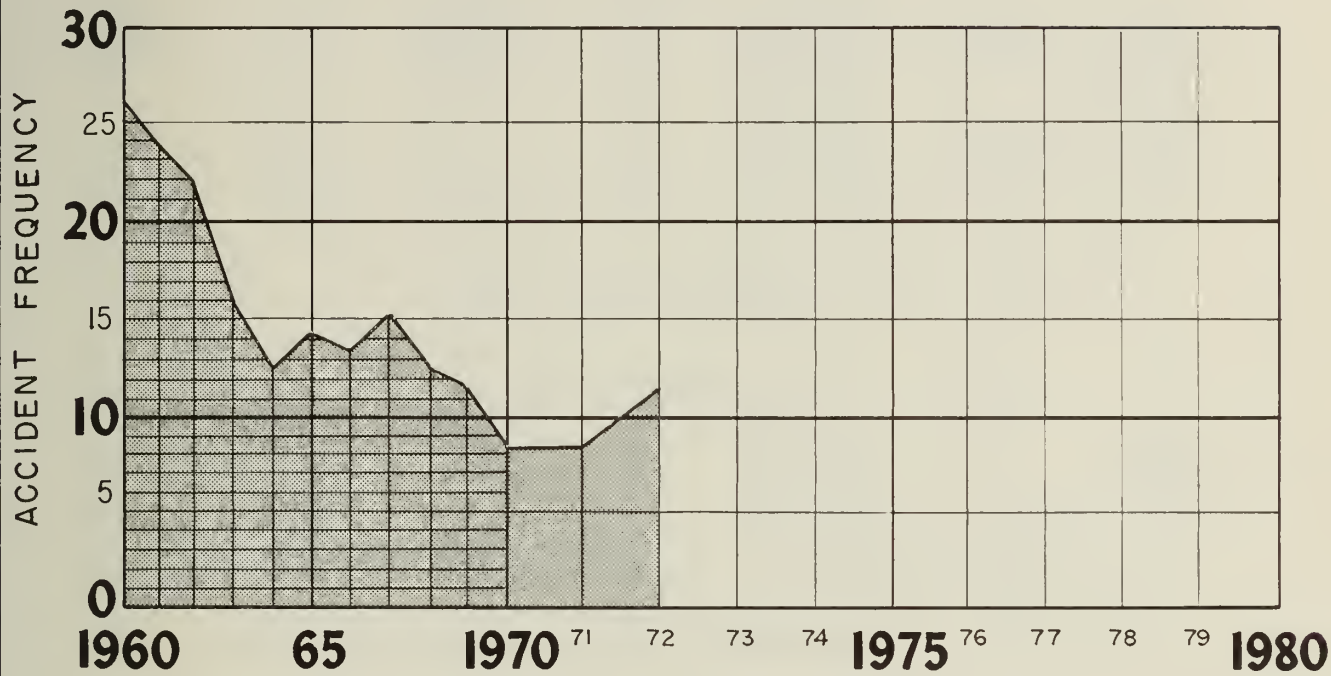
Administration	513, 852	0	0	0.0	0
Construction	331, 646	0	0	0.0	0
Investigation	239, 883	0	0	0.0	0
Irrigation O&M	127, 240	2	31	15.7	244
Power O&M	<u>577, 723</u>	<u>1</u>	<u>2</u>	<u>1.7</u>	<u>3</u>
1972 Totals	1, 790, 344	3	33	1.7	18
1971 Totals	1, 722, 851	0	0	0.0	0

### Lower Missouri Region

Administration	616, 120	0	0	0.0	0
Construction	337, 716	0	0	0.0	0
Investigation	206, 640	0	0	0.0	0
Irrigation O&M	100, 632	0	0	0.0	0
Power O&M	<u>554, 661</u>	<u>1</u>	<u>12</u>	<u>1.8</u>	<u>22</u>
1972 Totals	1, 815, 769	1	12	0.6	7
1971 Totals	1, 803, 476	3	22	1.7	12

\* \* \* \* \*

# CONTRACTOR FORCES



## WORK ACTIVITY - CONTRACTOR FORCES

Type of work	Man-hour exposure	Disabling injuries	Days lost	Frequency rate	Severity rate
Canals	1, 698, 356	28	6, 439	16. 5	3, 791
Concrete dams	2, 015, 722	6	6, 436	3. 0	3, 193
Earth dams	1, 142, 558	4	42	3. 5	37
Tunnels	1, 136, 320	30	7, 477	26. 4	6, 580
*Power facilities	366, 156	1	15	2. 7	41
Miscellaneous	671, 111	11	167	16. 4	249
1972 Totals	7, 030, 223	80	20, 576	11. 4	2, 927
1971 Totals	6, 780, 040	57	1, 599	8. 4	236

\* Covers transmission lines and substations.

## ORGANIZATIONAL UNIT

### Pacific Northwest Region

<u>Major activity</u>	<u>Man-hour exposure</u>	<u>Disabling injuries</u>	<u>Days lost</u>	<u>Frequency rate</u>	<u>Severity rate</u>
Canals	165,898	11	6,068	66.3	366
Concrete dams	2,013,860	6	6,436	3.0	3,196
Earth dams	639,163	2	37	3.1	58
Tunnels	66,467	0	0	0.0	0
Power facilities	197,766	0	0	0.0	0
Miscellaneous	<u>187,804</u>	<u>2</u>	<u>4</u>	<u>10.6</u>	<u>21</u>
1972 Totals	3,270,958	21	12,545	6.4	3,835
1971 Totals	2,815,678	7	566	2.5	201

### Mid-Pacific Region

Canals	973,662	10	190	10.3	195
Tunnels	133,024	4	6,140	30.1	46,157
Miscellaneous	<u>222,780</u>	<u>1</u>	<u>9</u>	<u>4.5</u>	<u>40</u>
1972 Totals	1,329,466	15	6,339	11.3	4,768
1971 Totals	1,019,660	9	177	8.8	174

### Lower Colorado Region

Canals	4,071	0	0	0.0	0
Power facilities	18,047	1	15	55.4	831
Miscellaneous	<u>27,057</u>	<u>6</u>	<u>146</u>	<u>221.8</u>	<u>5,396</u>
1972 Totals	49,175	7	161	142.3	3,274
1971 Totals	303,107	3	45	9.9	148

### Upper Colorado Region

Canals	6,627	0	0	0.0	0
Concrete dams	1,862	0	0	0.0	0
Earth dams	229,990	0	0	0.0	0
Tunnels	272,492	5	78	18.3	286
Power facilities	2,406	0	0	0.0	0
Miscellaneous	<u>129,381</u>	<u>1</u>	<u>5</u>	<u>7.7</u>	<u>39</u>
1972 Totals	642,758	6	83	9.3	129
1971 Totals	534,909	2	26	3.7	49

Southwest Region

<u>Major activity</u>	<u>Man-hour exposure</u>	<u>Disabling injuries</u>	<u>Days lost</u>	<u>Frequency rate</u>	<u>Severity rate</u>
Canals	102,834	4	116	38.9	1,128
Earth dams	21,419	0	0	0.0	0
Tunnels	248,149	11	1,093	44.3	4,405
Miscellaneous	<u>47,977</u>	<u>1</u>	<u>3</u>	<u>20.8</u>	<u>63</u>
1972 Totals	420,379	16	1,212	38.1	2,883
1971 Totals	373,104	14	330	37.5	884

Upper Missouri Region

Canals	417,997	3	65	7.2	156
Power facilities	92,929	0	0	0.0	0
Miscellaneous	<u>31,429</u>	<u>0</u>	<u>0</u>	<u>0.0</u>	<u>0</u>
1972 Totals	542,355	3	65	5.5	120
1971 Totals	402,229	4	130	9.9	323

Lower Missouri Region

Canals	27,267	0	0	0.0	0
Earth dams	251,986	2	5	7.9	20
Tunnels	416,188	10	166	24.0	399
Power facilities	55,008	0	0	0.0	0
Miscellaneous	<u>24,683</u>	<u>0</u>	<u>0</u>	<u>0.0</u>	<u>0</u>
1972 Totals	775,132	12	171	15.5	221
1971 Totals	1,331,353	18	325	13.5	244

\* \* \* \* \*



# RECLAMATION JOB CORPS CIVILIAN CONSERVATION CENTERS

## 1971 CUMULATIVE ACCIDENT RECORD

<u>Region</u>	<u>Man-hour exposure</u>	<u>Disabling injuries</u>	<u>Days lost</u>	<u>Frequency rate</u>	<u>Severity rate</u>
Pacific					
Northwest	2, 667, 632	3	122	1. 1	46
Upper Colorado	<u>2, 164, 970</u>	<u>3</u>	<u>31</u>	<u>1. 4</u>	<u>14</u>
1972 Totals	4, 832, 602	6	153	1. 2	32
1971 Totals	5, 004, 546	3	42	0. 6	8

## VEHICLE ACCIDENT EXPERIENCE

<u>Region</u>	<u>No. of accidents</u>	<u>Mileage</u>	<u>Accident rate</u>	<u>Estimated damage</u>	
				<u>Government</u>	<u>Private</u>
Pacific Northwest	6	560, 376	10. 7	\$1, 540	\$ 225
Upper Colorado	<u>7</u>	<u>314, 376</u>	<u>22. 3</u>	<u>900</u>	<u>1, 875</u>
1972 Totals	13	874, 752	14. 9	\$2, 440	\$2, 100
1971 Totals	25	920, 973	27. 1	\$5, 538	\$2, 828

Vehicle accidents involving Job Corps staff: 7  
 Vehicle accidents involving VISTA workers: 0  
 Vehicle accidents involving corpsmen: 6

THE JOB CORPS CIVILIAN CONSERVATION CENTER  
 COLLBRAN, COLORADO  
 ESTABLISHED EXEMPLARY SAFETY RECORDS DURING  
 1970, 1971 AND 1972 BY COMPLETING THE YEARS  
 WITHOUT A SINGLE DISABLING INJURY

\* \* \* \* \*

# VEHICLE ACCIDENTS

THE FOLLOWING TABLE SHOWS BUREAU VEHICLE  
ACCIDENT EXPERIENCE SINCE 1962:

<u>Year</u>	<u>No. of accidents</u>	<u>Accident rate*</u>	<u>Estimated damage</u>
1972	111	3.4	\$32,984
1971	104	3.3	37,631
1970	85	2.6	26,494
1969	102	3.1	24,388
1968	97	2.6	13,313
1967	117	3.1	32,582
1966	125	3.1	26,771
1965	116	2.9	23,205
1964	114	2.8	36,410
1963	134	3.4	25,130
1962	125	3.4	33,100

\* Number of accidents per million miles driven.

THE FOLLOWING TABLE COMPARES THE VEHICLE ACCIDENT  
EXPERIENCE OF MAJOR ORGANIZATIONAL UNITS  
OF RECLAMATION FOR CALENDAR YEAR 1972

<u>Region</u>	<u>No. of accidents</u>	<u>Mileage</u>	<u>Accident rate*</u>	<u>Estimated damage</u>
Washington Office	1	90,000	11.1	\$ 0
E&R Center, Denver	2	462,056	4.3	491
Pacific Northwest	14	3,523,142	4.0	2,203
Mid-Pacific	18	7,484,750	2.7	5,618
Lower Colorado	12	3,766,169	3.2	1,895
Upper Colorado	14	3,808,689	3.7	2,527
Southwest	12	4,599,743	2.7	7,502
Upper Missouri	13	4,727,276	2.7	4,420
Lower Missouri	25	4,134,982	6.0	8,328
1972 Totals	111	32,596,807	3.4	\$32,984
1971 Totals	104	31,977,132	3.3	\$37,631

\* Number of accidents per million miles driven.

Note: Estimated damage covers only the cost of repair or replacement of the Government vehicle involved. It is estimated that over \$10,000 of the \$32,984 estimated damage in 1972 will be recovered by the Government.

\* \* \* \* \*

# ACCIDENT COSTS

Accidents do not always involve personal injury to employees but may result in the destruction or loss of property and third-party claims. Consideration and review of costs resulting from accidents is essential to the appraisal of any accident prevention program. The following summary of estimated accident costs for calendar years 1972, 1971, 1970, and 1969 is presented for this purpose.

<u>Type of accident</u>	<u>1972</u>	<u>Estimated Cost</u>		<u>1969</u>
		<u>1971</u>	<u>1970</u>	
Work injuries <u>1/</u>				
Disabling injuries	\$ 37,680	\$ 36,180	\$ 36,168	\$ 39,480
Nondisabling injuries	29,820	22,740	25,740	26,580
Fatal injuries	101,367 <u>2/</u>	97,484	82,512	153,388
Fires	86,360	1,590	0	30,700
Tort claims <u>3/</u>	14,030	33,822	166,152	22,123
Employee claims	504	149	328	423
Motor vehicle accidents	32,984	37,631	26,494	24,388
Other property damage	<u>24,620</u>	<u>26,944</u>	<u>29,099</u>	<u>122,066</u>
	\$327,365	\$256,540	\$366,493	\$419,148

1/ Cost estimate based on past 5-year average cost.

2/ Fatality is not chargeable under American National Standards Institute "Method of Recording and Measuring Work Injury Experience," Z16.1, nor included in Bureau frequency and severity rates. Office of Federal Employees' Compensation ruling has not been received.

3/ Tort claims resulting from accidents adjudicated during 1969, 1970, 1971, and 1972.

The costs shown are estimated direct costs resulting from accidents.

STUDIES CONDUCTED BY COMPETENT AND  
RECOGNIZED AUTHORITIES INDICATE THAT  
INDIRECT ACCIDENT COSTS EXCEED DIRECT  
ACCIDENT COSTS BY A RATIO OF 4:1

\* \* \* \* \*

# PUBLIC SAFETY

## RECORD OF PUBLIC DROWNINGS

<u>Bureau-operated Facilities:</u>	<u>CY72</u>	<u>CY71</u>	<u>CY70</u>
Dams	0	1	0
Canals	24	26	24
Reservoirs	2	1	1
Total	<u>26</u>	<u>28</u>	<u>25</u>

### Facilities Operated by Others:

Irrigation and Water Districts	39	27	38
State or County (Recreational)	49	45	55
Total	<u>88</u>	<u>72</u>	<u>93</u>

### Summary of Total Drownings

#### During Period:

##### By Operating Agency:

Bureau of Reclamation	26	28	25
Irrigation and Water Districts	39	27	38
State or County (Recreational)	49	45	55
Total	<u>114</u>	<u>100</u>	<u>118</u>

##### By Type of Facility:

Dams	0	1	0
Canals	53	52	56
Reservoirs	61	47	62
Total	<u>114</u>	<u>100</u>	<u>118</u>

##### By Activity:

Swimming	34	35	43
Boating	21	9	16
Fishing	4	7	6
Fell into water	21	26	16
Other	34	23	37
Total	<u>114</u>	<u>100</u>	<u>118</u>

##### By Age:

Under 12 years of age	18	18	18
From 12 to 25	43	51	59
From 25 to 50	35	18	21
Over 50 years of age	18	13	20
Total	<u>114</u>	<u>100</u>	<u>118</u>

\* \* \* \* \*



# **SAFETY AWARDS**

## **COMMISSIONER'S ANNUAL SAFETY AWARD - 1972**

Presented to the Lower Colorado Region, Boulder City, Nevada, in recognition of the best safety record for Government forces during calendar year 1972.

In winning the Commissioner's Annual Safety Award, employees of the Lower Colorado Region worked 2,043,745 man-hours with only one disabling injury resulting in 1 day's lost time. The Lower Colorado Region also won the Award for 1964 and 1966.

## **NATIONAL SAFETY COUNCIL AWARDS**

### **AWARD OF HONOR (1971)**

Mid-Pacific Region - Sacramento, California

Upper Missouri Region - Billings, Montana

### **AWARD OF MERIT (1971)**

Bureau of Reclamation - Bureau-wide

Southwest Region - Amarillo, Texas

Lower Missouri Region - Denver, Colorado

## **NATIONAL FLEET SAFETY CONTEST (1971)**

Upper Colorado Region, Salt Lake City, Utah - Second Place, Regular Passenger Car Division, Western Region Groups, Group 1.

Southwest Region, Amarillo, Texas, Honorable Mention, Government Division, Intercity Group, Common Carrier Truck Division.

THE DEPARTMENT OF THE INTERIOR'S  
CERTIFICATE OF SAFETY ACHIEVEMENT AWARD - 1972

IN RECOGNITION OF OVER 2,000,000 MAN-HOURS WORKED WITHOUT A DISABLING INJURY:

Auburn-Folsom South Unit CVP Construction Office - Auburn,  
California  
Central Utah Project - Provo, Utah

IN RECOGNITION OF OVER 1,500,000 MAN-HOURS WORKED WITHOUT A DISABLING INJURY:

Folsom Field Division, Folsom, California

IN RECOGNITION OF OVER 1,000,000 MAN-HOURS WORKED WITHOUT INJURY:

Collbran Job Corps Civilian Conservation Center - Collbran,  
Colorado  
Grand Coulee Dam Operations Office - Coulee Dam, Washington  
Missouri-Souris Projects Office - Bismarck, North Dakota  
Yuma Projects Office - Yuma, Arizona

IN RECOGNITION OF OVER 500,000 MAN-HOURS WORKED WITHOUT A DISABLING INJURY:

Middle Rio Grande Project - Albuquerque, New Mexico  
Oklahoma City Development Office - Oklahoma City, Oklahoma  
Parker-Davis Project - Phoenix, Arizona  
South Platte River Projects - Loveland, Colorado

IN RECOGNITION OF OVER 2,000,000 ACCIDENT-FREE MILES:

Central Utah Project - Provo, Utah

IN RECOGNITION OF OVER 1,000,000 ACCIDENT-FREE MILES:

Rio Grande Project - El Paso, Texas

IN RECOGNITION OF OVER 500,000 ACCIDENT-FREE MILES:

Folsom Field Division - Folsom, California  
Fresno CVP Construction Office - Fresno, California  
Kansas River Projects - McCook, Nebraska  
Missouri-Souris Projects Office - Bismarck, North Dakota  
Parker-Davis Project - Phoenix, Arizona  
Shasta Field Division - Redding, California  
South Platte River Projects - Loveland, Colorado  
Substation Maintenance Branch, Power Division, Missouri-Oahe  
Projects Office - Huron, South Dakota



Pacific Northwest Assistant Regional Director Norman Moore presented Operations Manager R. K. Seely with a Certificate of Safety Achievement in recognition of 1,239,659 man-hours worked without a lost-time accident by employees of the Grand Coulee Dam Operations Office. Pictured are, left to right, Operations Office Safety Officer T. G. Skordas; Messrs. Seely and Moore; and Regional Safety Officer Lauren Simon. Photo PX-D-73036



Yuma Projects Office, Arizona, attained 1,074,966 man-hours during the period April 16, 1968 to May 31, 1972, without a disabling injury. Ronald J. Searle (right), Chief, Division of Safety, E&R Center in Denver, is shown congratulating T. K. Moser, Project Manager, (center) and Fred J. Lasko, Lower Colorado Regional Safety Engineer, while presenting the Certificate of Safety Achievement. Photo PX-D-73035

## CONSTRUCTION SAFETY AWARD - 1972

The Construction Safety Award is presented to contractors in recognition of exemplary safety records achieved while performing work for Reclamation. To be eligible, a contractor must have initiated and carried out an effective safety program during the term of his contract. He must have achieved a cumulative accident record lower than the average record obtained by all Bureau contractors during the preceding 3-year period. Equally important, he must have indicated a sincere interest in the safety of his employees by virtue of expending the time and effort necessary to carry out an aggressive and continuing safety effort. The following Bureau contractors earned Construction Safety Awards during 1972:

Addison Construction Company - Denver, Colorado  
Burdick Contractors, Inc. - Las Vegas, Nevada  
Carmack Drilling Company - Glenwood Springs, Colorado  
Commonwealth Electric Company - Lincoln, Nebraska  
Dravo Corporation - Burlingame, California  
Dryco, Inc. - Downey, California  
Fisher Brothers, Inc. - Rio Vista, California  
Gordon H. Ball, Inc. - Danville, California  
Granite Construction Company - Watsonville, California  
Jacobson Construction Company - Huron, South Dakota  
Kehne Electric Company, Inc. - St. Paul, Minnesota  
Marco Electric, Inc. - Orangevale, California  
Pearson Construction Company - Rapid City, South Dakota  
Pinello-Hefner Construction Company - Colorado Springs,  
Colorado  
Richards & Associates, Inc. - Carrollton, Georgia  
Syblon-Reid Company - Los Banos, California  
United Power, Contractors and Engineers, Inc. - Seattle,  
Washington

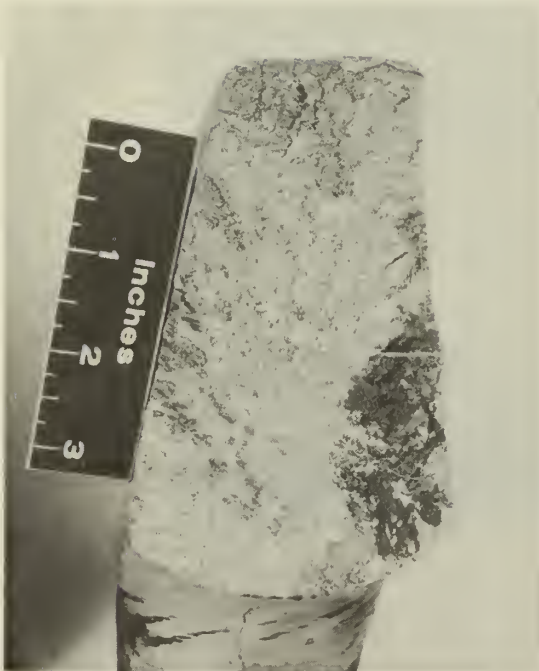
\* \* \* \* \*



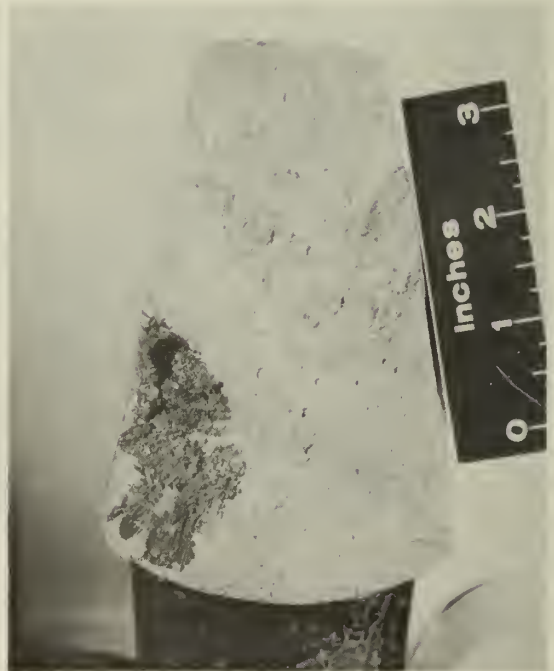
CRANE HOOK FAILURE!



PX-D-73037



PX-D-73038



PX-D-73039

The crane hook shown on the foregoing page was in normal use for only a few months when it failed under a partial loading. The two lower pictures are closeup views of the broken ends and graphically illustrate the reason for failure. The two pieces fitted together in the center photograph show the relative failure point.

Similar hook failures can be prevented with a good sound inspection program as outlined in the following regulations.

## OCCUPATIONAL SAFETY AND HEALTH STANDARDS

Section 1910.179, Overhead and gantry cranes (j)(3)(ix): "Crane hooks. Magnetic particle or other suitable crack detecting inspection should be performed at least once each year."

### BUREAU OF RECLAMATION POWER MAINTENANCE INSTRUCTION NO. 24

Failure of a crane hook can result in extensive damage to equipment and serious injury to personnel.

To assure the integrity of all Bureau crane hooks, the following program is recommended:

1. Discontinue the practice of painting crane hooks and remove the paint from existing hooks to facilitate visual inspection.
2. A visual inspection of each crane hook should be made prior to any heavy lifting and on a monthly basis.
3. Crane hooks should be measured annually and discarded if the throat measurement has increased 15 percent from the original dimension.
4. Incipient cracks are not always visible. Each hook should therefore be checked annually for cracks by being subjected to a Magnaflux, Zyglo, or some other suitable nondestructive crack detection test. If equipment for these tests is not available in the Region or from local test equipment rental sources, this office will aid in locating such equipment upon request.

\* \* \* \* \*

# SAFETY PERFORMANCE RECORD

## CUMULATIVE QUARTERLY REPORT

### GOVERNMENT FORCES

4th QUARTER, 1922

PERIOD FROM JANUARY 1, 1922... THROUGH... December 31, 1922...

REPORTING OFFICE	NUMBER OF EMPLOYEES	MAN HOURS	DISABLING INJURIES		DAYS LOST	FREQUENCY RATE	SEVERITY RATE
		CUMULATIVE THIS YEAR	CUMULATIVE THIS YEAR	FATAL *	CUMULATIVE THIS YEAR	CUMULATIVE THIS YEAR	CUMULATIVE THIS YEAR
Washington Office	252	488,214					
Danvers E&R Center	1,235	2,528,926					
PACIFIC NORTHWEST REGION							
Boise Regional Office	192	369,678	1		2	2.7	5
Central Snake Project	38	66,560	2		6	30.0	90
Chief Joseph Dam Project	30	57,688					
Columbia Basin Project	216	460,736	2		8	4.3	17
East Greenacres	15	25,446					
Grand Coulee Dam Operations Office	278	576,294	2		3	3.4	5
Green Springs Powerplant	3	4,041					
Hungry Horse Project	35	68,161					
Lower Columbia Planning Office	32	62,976					
McKay Dam	1	2,080					
Minidoka Project	65	134,436					
SNAKE RIVER PLANNING OFFICE	34	66,172					
Teton Project Office	56	84,753	1		4	11.8	47
Third Powerplant Construction Office	205	407,530					
Tualatin Project Office	38	58,668	2		43	34.1	733
Upper Columbia Planning Office	30	56,380					
Yakima Project Office	29	53,468	1		20	18.7	374
Totals & Averages	1,297	2,555,067	11		86	4.3	34
MID-PACIFIC REGION							
Sacramento Regional Office	486	1,056,043					
Regional Drill Crew	15	39,336	1		6	25.4	152
Auburn-Folsom South Unit CVP Construction Office	157	401,158	1		4	2.5	10
Cachuma Operations Field Branch	2	4,016					
Central Coast Planning Field Branch	3	5,760					
Folsom Field Division	82	161,214					
Fresno CVP Construction Office	277	467,621					
Fresno Field Division	133	267,584					
Klamath Project Office	17	32,499					
Lahontan Basin Projects Office	21	43,553					
Sacramento Valley CVP Constr. Office	127	226,428					
San Luis Unit CVP Construction Office	133	31,370					
Shasta Field Division	2	272,372					
Solano Operations Field Branch	2	4,200					
Tracy Field Division	151	314,543	2		51	6.4	162
Totals & Averages	1,606	3,327,697	4		61	1.2	18
LOWER COLORADO REGION							
Boulder City Regional Office	218	400,800					
Arizona Projects Office	122	212,700					
Boulder Canyon Project	140	300,564	1		1	3.3	3
Lower Colorado River Project		152,090					
Parker-Davis Project	290	624,631					
Southern California Planning Office	17	30,604					
Yuma Projects Office	253	322,336					
Totals & Averages	1,040	2,043,745	1		1	0.5	1
UPPER COLORADO REGION							
Salt Lake City Regional Office	205	440,964	2		25	4.5	57
Central Utah Projects	200	416,403					
CRSP Power Operations - Montrose	267	489,722	1		13	2.0	27
Durango Projects Office	65	115,809	1		1	8.6	9
Grand Junction Projects Office	97	224,367					
Logan Development Office	5	10,400					
Lyman Project Office	11	17,908					
Upper Green River Projects Office	10	26,664					
Totals & Averages	860	1,742,237	4		39	2.3	22
SOUTHWEST REGION							
Amarillo Regional Office	115	228,662					
Albuquerque Development Office	25	54,645					
Austin Development Office	24	58,544					
Loan Program Projects Office	2	2,202					
Middle Rio Grande Project	225	441,115					
Mountain Park Project	54	89,787					
Navajo Project	91	193,474	4		142	20.7	734
Oklahoma City Development Office	16	28,718					
Palmetto Bend Project	47	61,585					
Pecos River Office	18	31,947					
Rio Grande Project	179	350,189	2		10	5.7	29
San Juan-Chama Project	18	40,960					
Totals & Averages	814	1,581,828	6		152	3.8	96
CONSOLIDATED TOTALS							
TOTALS LAST YEAR (19 )							

\*FATALITIES INCLUDED IN TOTAL DISABLING

**SAFETY PERFORMANCE RECORD**  
CUMULATIVE QUARTERLY REPORT  
GOVERNMENT FORCES

4th QUARTER, 1972

PERIOD FROM JANUARY 1, 1972 THROUGH December 31, 1972

REPORTING OFFICE	NUMBER OF EMPLOYEES	MAN HOURS	DISABLING INJURIES		DAYS LOST	FREQUENCY RATE	SEVERITY RATE
		CUMULATIVE THIS YEAR	CUMULATIVE THIS YEAR	FATAL*	CUMULATIVE THIS YEAR	CUMULATIVE THIS YEAR	CUMULATIVE THIS YEAR
UPPER MISSOURI REGION							
Billings Regional Office	164	313,600					
Geology and Drill Crews	6	15,692					
Canyon Ferry Project	20	36,813	1		2	27.2	54
Fort Peck Project	41	73,504					
Missouri-Osage Projects	214	387,200					
Missouri-Souris Projects	349	662,772	1		6	1.5	9
Power System Operations Office	50	103,200					
Riverton Project	5	9,362					
Upper Missouri Projects	62	119,403	1		25	8.4	209
Yellowtail Project Office	33	68,798					
Totals & Averages	944	1,790,344	3		33	1.7	18
LOWER MISSOURI REGION							
Denver Regional Office	182	373,720					
Cheyenne Construction Office	31	36,121					
Fryingpan-Arkansas Project	191	378,472					
Kansas River Projects	91	189,240					
Niobrara-Lower Platte Planning Office	39	78,600					
North Platte River Projects	202	439,280	1		12	3.1	38
South Platte River Projects	155	320,336	1		12	0.6	7
Totals & Averages	891	1,815,769	1		12	0.6	7



# SAFETY PERFORMANCE RECORD

## CUMULATIVE QUARTERLY REPORT

### CONTRACTOR FORCES

4th QUARTER, 1972

PERIOD FROM JANUARY 1, 1972... THROUGH December 31, 1972...

REPORTING OFFICE	NUMBER OF EMPLOYEES	MAN HOURS	OISABLING INJURIES		DAYS LOST	FREQUENCY RATE	SEVERITY RATE
		CUMULATIVE THIS YEAR	CUMULATIVE THIS YEAR	FATAL <sup>*</sup>	CUMULATIVE THIS YEAR	CUMULATIVE THIS YEAR	CUMULATIVE THIS YEAR
PACIFIC NORTHWEST REGION							
Boise Regional Office		881					
Central Snake Project		150					
Chief Joseph Dam	30	51,588					
Columbia Basin Project	111	165,858	11	1	6,068	66.3	36,576
East Greenacres Project Office	1	3,694					
Grand Coulee Dam Operations Office		3,401					
Hungry Horse Project		200					
Teton Basin Project	341	585,365	2		37	3.4	63
Third Powerplant Construction Office	1,102	2,324,494	6	1	6,436	2.5	2,768
Tualatin Project	99	131,871	1		1	7.6	8
Yakima Project		1,416	1		3	706.2	2,118
Totals & Averages	1,684	3,270,958	21	2	12,545	6.4	3,835
MID-PACIFIC REGION							
Sacramento Regional Office		232					
Auburn-Folsom South Unit CVP Construction Office	85	732,489	10	1	6,204	13.7	8,470
Folsom Field Division		1,920					
Fresno CVP Construction Office	392	462,294	4		125	9.9	311
Klamath Project Office	6	2,662					
Sacramento Valley CVP Constr. Office	140	160,196	1		10	6.2	62
San Luis CVP Construction Office		21,797					
Shasta Field Division		1,443					
Tracy Field Division		6,433					
Totals & Averages	623	1,329,466	15	1	6,339	11.3	4,768
LOWER COLORADO REGION							
Boulder City Regional Office		11,379	6		146	527.3	12,831
Arizona Projects Office	6	2,536					
Boulder Canyon Project		4,502					
Lower Colorado River Project		1,835					
Parker-Davis Project	9	19,852	1		15	50.4	756
Yuma Projects Office		4,071					
Totals & Averages	15	49,175	7		161	142.3	3,274
UPPER COLORADO REGION							
Salt Lake City Regional Office	11	24,791					
Central Utah Projects	148	533,856	5		77	9.4	144
Grand Junction Projects Office	60	81,008	1		6	12.3	74
Upper Green River Projects	4	3,103					
Totals & Averages	223	642,758	6		83	9.3	129
SOUTHWEST REGION							
Amarillo Regional Office		120					
Mountain Park Project	16	14,472					
Navajo Project	273	382,322	15		1,209	39.2	3,162
Palmetto Bend Project		4,412					
Rio Grande Project	13	3,421					
San Juan-Chama Project	6	15,632	1		3	64.0	192
Totals & Averages	308	420,379	16		1,212	38.1	2,883
UPPER MISSOURI REGION							
Missouri-Oahe Projects	10	38,946					
Missouri-Souris Projects	149	478,585	3		65	6.3	136
Riverton Project		5,583					
Upper Missouri Projects	11	19,241					
Total & Averages	170	542,355	3		65	5.5	120
LOWER MISSOURI REGION							
Cheyenne Construction Office	29	49,993					
Fryingpan-Arkansas Project	422	685,025	12		171	17.5	250
Kansas River Projects	6	27,267					
North Platte River Projects	3	12,847					
Totals & Averages	460	775,132	12		171	15.5	221
Average number of contractor employees per month 1972: 3,752							
CONSOLIDATED TOTALS							
TOTALS LAST YEAR(1971)							
	3,483	7,030,223	80	3	20,576	11.4	2,927
	2,946	6,780,040	57		1,599	8.4	236

\*FATALITIES INCLUDED IN TOTAL DISABLING



## PROCLAMATION 4184

## Save Your Vision Week, 1973

*By the President of the United States of America*

## A Proclamation

Like many precious possessions, eyesight is usually taken for granted until it is lost. Yet the preservation of vision—one of life's greatest blessings—need not be left to chance. There are steps all of us can take to help keep our eyes healthy for a lifetime of useful service.

Simple safety precautions can substantially reduce the number of accidents which cause loss of vision. Potential sources of eye injury in the home, at work, and at school can be sought out and eliminated.

However, most blindness in the United States is the result not of injury, but of disease. Proper attention to hygiene, good nutrition, and, most important, regular professional eye examinations can minimize the risk of visual disability.

Glaucoma, one of the most common eye diseases, can be detected through a simple and painless test and, if detected early, can usually be arrested and controlled.

Many elderly Americans are unnecessarily blind because of cataracts. It is tragic that unwarranted fear of cataract surgery—successful in 95 percent of the cases—keeps many of our older citizens from regaining their sight.

For visual loss that can now neither be prevented nor cured, research such as that conducted by the Federal Government through the National Eye Institute offers new hope.

To encourage greater awareness of the importance of preserving sight, the Congress, by a joint resolution approved December 30, 1963 (77 Stat. 629), requested the President to proclaim the first week in March of each year as Save Your Vision Week.

NOW, THEREFORE, I, RICHARD NIXON, President of the United States of America, do hereby proclaim the week of March 4, 1973, as Save Your Vision Week. I invite the Governors of the States and appropriate local government officials to issue similar proclamations, and I call upon the Nation's mass communications media to join in bringing to the attention of all Americans the importance of preventive vision care.

IN WITNESS WHEREOF, I have hereunto set my hand this twenty-ninth day of January, in the year of our Lord nineteen hundred seventy-three, and of the Independence of the United States of America the one hundred ninety-seventh.

A handwritten signature in dark ink, reading "Richard Nixon". The signature is written in a cursive style with a large, stylized "R" and "N".















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